



There is no time after COVID-19, only before and now.

Dear Colleagues,

We have tried to summarize the available and pertinent scientific information on SARS-CoV-2 to evaluate the current situation in depth. Our clinic is located in Ansbach, Bavaria, Germany and the majority of our work is oral and maxillofacial surgery but also some dentistry. Our main focus lies in the following fields: bone and tissue augmentation surgery and implantology in non-healthy patients; surgical and non surgical therapy of all types of jaw bone pathology; surgical and non-surgical treatment of nasal and paranasal sinus diseases and head and neck oncology. In our country dental and medical offices are open in the Corona - crisis under the regulations of the Robert-Koch-Institut (RKI, the highest German authority on health issues), a decision we completely concur with.

A) Introduction

As a matter of fact, we critically evaluate regulations for their practical application, and as oral and maxillofacial surgeons who lead a private practice and a department in the regional hospital we regularly have to work in potentially hazardous environments and treat patients with infectious diseases. However, we are not specialized in virology and hygiene sciences. Thus, this is not an official statement but simply the result of our privately conducted research on SARS-CoV-2 since its outbreak in Wuhan, China, in January 2020. As the scientific knowledge in this field expands rapidly we continuously try to update ourselves in order to achieve the highest level of protection for our patients, our team and ourselves.

We completely understand the fear that troubles health workers, and we share the desire to protect our families and ourselves. Yet, we still have to fulfill our duty and provide patient care.

So what do we know? SARS-CoV-2 is an RNA virus from the family of the so-called *Coronaviridae* which has been known since the 1960s. The special subtype we are currently confronted with was identified in January 2020. This means that this virus is new but its kind is not, and thus it has features that are known and have been researched for a long time.

The current crisis that followed the outbreak of SARS-CoV-2 and its rapid worldwide spread challenges the health systems all over the world and threatens to overload their capacities. Although there are discussions in scientific and popular media about its dangers, COVID-19 is a severe disease and thus concerns are justified. Furthermore, it won't just disappear.

However, there are some basic rules that should be followed by medical professionals and healthcare workers in any crisis, but especially in pandemic situations.

Nothing but verified information should be disseminated. Professionals have the task to critically evaluate the situation, deal with the situation with the appropriate caution but also prevent the spread of panic. True experts and institutions shall set the guidelines, not single individuals. Within one clinic or office, the guidelines can be interpreted differently depending on local and individual risk factors. However, there is no need to publicly claim that one's individual solution shall become universal, as this causes confusion in public opinion. This is especially true for situations that will persist for some time.

For an assessment on how long we will face the problem, the following article is recommended.
<https://medium.com/@tomaspuero/coronavirus-the-hammer-and-the-dance-be9337092b56>

The goal of a lockdown and the similar measures taken by so many countries right now is not to prevent everyone from getting infected—the aim is to flatten the curve of the infection so that the

health system may not be overloaded. Although COVID-19 dominates people's perception right now, all other diseases are still with us, and thus the treatment of the sick and injured of any kind has to proceed as normal as possible.

B) Facts

Allow us to address some of the most disputed topics:

1. The spray and aerosol cloud generated during dental procedures is seen as a danger zone. Pathogen-containing aerosols are a clear and present danger for **any** dental and medical procedure in the upper respiratory area. As it is known that SARS-CoV-2 can be present and replicate in the pharyngeal area, the health hazard by aerosol-producing procedures has to be examined. Given that the literature and the Robert-Koch-Institut (RKI, the highest German authority on health issues) state the main route of transmission is droplets. It is known that, in experimental laboratory settings, aerosols can contain particles of SARS-CoV-2 that may be infective and hazardous (https://www.nejm.org/doi/full/10.1056/NEJMc2004973?url_ver=Z39.88-2003&rfr_id=ori%3Arid%3Acrossref.org&rfr_dat=cr_pub%3Dpubmed) (this is not from a real clinical setting with people, air circulation, and suction to reduce the spray). The same study also demonstrates that SARS-CoV-1, that caused the epidemic in 2003, is contained in aerosols in higher doses than SARS-CoV-2. However, it is unclear whether these particles actually are sufficient to cause an infection (https://www.rki.de/DE/Content/InfAZ/N/Neuartiges_Coronavirus/Steckbrief.html). It is important to distinguish aerosols with experimental high virus loads from water spray–diluted aerosols. Furthermore, it was demonstrated that the virus could be detected with a pharyngeal swap test in only 30% of the active symptomatic COVID-19 patients, whereas this test is nearly always positive for bronchial fluids or sputum (<https://jamanetwork.com/journals/jama/fullarticle/2762997>). These data have to be considered when assessing the risk of dental procedures, given that it would be the pharyngeal virus load that is stirred up, and it strengthens the importance of virus transmission via the cough of the patients. Antimicrobial mouthwash (especially hydrogen peroxide) seems to reduce the virus load. Initial studies have suggested that chlorhexidine solutions are less effective (<https://pubmed.ncbi.nlm.nih.gov/32035997/>). Also it is important to take the contamination reduction of about 90% of dental suction into account (<https://www.ncbi.nlm.nih.gov/pubmed/12271865>). The regulations of health authorities including the RKI that require a distance of 1.5 to 2 m between people are supported by these findings, as even droplets that occur while speaking to a person may be a source of infection. Dental personnel are usually protected by standard gear that has been mandatory for years, as multiple potential hazardous pathogens can be found in the oral cavity, the nose, and the pharyngeal area, and the water spray–induced aerosols of dental procedures may carry these to the surrounding people. Thus the situation caused by SARS-CoV-2 is not totally new. The German association for hospital hygiene demands a normalization of the situation and clearly emphasizes that speaking, singing, and coughing are the main sources for the spread of this virus. https://www.krankenhaushygiene.de/ccUpload/upload/files/2020_03_22_DGKH_Mitteilung_Ausgangssperre_RKG_Konzept.pdf.

—> Implications for daily practice

Yes, it is highly likely that particles of SARS-CoV-2 can be found in aerosols. Key to contagion is the presence of enough virus particles to start an infection. The fact of whether dental aerosols (water spray dilution, suction, rooms with moving people, etc) coming from SARS-CoV-2 positive patients can actually cause an infection has not yet been examined. Please also consider the clinical findings from Wuhan that are cited later in this document. The main sources of infection are casual contacts with people outside of the setting of a dental or medical clinic. Considering these facts, the approach of the RKI not to close private offices is totally sound.

By the way, did you know that HIV particles could be found in dental aerosols? Here is your proof:

<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6357359/>

<https://www.ncbi.nlm.nih.gov/pubmed/1529914>

<https://www.ncbi.nlm.nih.gov/pubmed/15127864>

Not every HIV-positive patient reveals their status, and still we continue to treat our patients normally.

2. The regular surgical mask, combined with a surgical cap, goggles, and maybe a disposable gown, is recommended by the RKI as regular protective gear for healthy non SARS-CoV-2 positive patients. This has been criticized extensively and N95 masks have been demanded because every asymptomatic patient might yet be infected. Let us review what N95 masks are: they are categorized in FFP (filtering face piece) classes by the amount of particles of sizes up to 0.6 microns that can penetrate the mask in an experimental lab setting. In these lab tests, N95 masks filter far more particles than regular surgical masks. Aerosols contain particles sizes below 5 microns. However, the existing evidence does not prove that these masks are superior in clinical settings (<https://pubmed.ncbi.nlm.nih.gov/26952529/>). There are even studies that demonstrate that, in spite of their better filtering capabilities, N95 masks are less efficient than regular surgical masks in a non-experimental and thus real setting (<https://pubmed.ncbi.nlm.nih.gov/27754781/>; <https://www.lungenaerzte-im-netz.de/news-archiv/meldung/article/teure-atemschutzmaske-schuetzt-nicht-besser-vor-grippe-als-einfacher-mundschutze/>)

For certain, what is more important than the kind of mask used is the correct handling of the protective equipment. *A simple guide can be found here:*

https://www.dr-troeltzsch.de/fileadmin/user_upload/dokumente/2020/2020_Removal_Re-application_Surgical_Mask.pdf

In general, one has to distinguish between asymptomatic and likely SARS-CoV-2 negative patients (how we check on that is mentioned in chapter C) and SARS-CoV-2 positive patients. While the regular protective gear seems to be sufficient for the first group, the second group must only be treated with N95 masks and additional gear. To refrain from any treatment and to close dental and medial offices seems inappropriate and even unethical, given that patient need for treatment does not cease with the outbreak of SARS-CoV-2.

—> Implications for daily practice

Is our standard protective gear 100% safe against all infectious pathogens? Definitely not, and this is not new information (eg, tuberculosis). But the statements from the RKI that standard protective gear is sufficient for non SARS-CoV-2 patients make total sense. As health authorities state, COVID-19 patients must be treated using N95 masks, but it remains unclear if these are truly superior and seems to depend a lot on correct handling.

3. We saw statements that compare dental and medical offices to beauty parlors and even the claim that dentists are “super spreaders” of the new virus. This is simply not true. Please consider that we do not face an all-new supervirus but a family member of the *Coronaviridae*. Dental and medical offices are some of the places where the strictest hygiene rules are applied; this was true before SARS-CoV-2 and this virus did not change that. Adaptations of hygiene rules and organization procedures are necessary depending on the data. The procedures in our office can be found in the “implications for daily practice.” All the guidelines for the treatment of COVID-19 patients claim that the patient should wear a surgical mask. It is important that the staff of the clinic wears masks at all times, as this is a major factor to prevent the distribution of the virus in case one gets infected. In the School and Hospital of Stomatology at Wuhan University, 0.47% of the dental staff and students that worked there became infected, although normal dental treatment was carried out with normal protective gear for several weeks in the middle of the outbreak and it seems that none of the infected persons transmitted the disease due to the standard protective gear. (<https://journals.sagepub.com/doi/full/10.1177/0022034520914246>).

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We suggest that every staff member of the clinic always—even when just talking to each other—wears mask and goggles and also refrains from any form of physical greeting. This way, the risk of spreading the virus is minimized. *Our specific SARS-CoV-2 hygiene guidelines can be found here:*

https://www.dr-troeltzsch.de/fileadmin/user_upload/dokumente/2020/2020_Hygiene_protocol_SARS-CoV-2.pdf

4. Many people, especially in social media, state the opinion that authorities were not adequately prepared for this pandemic. In many cases, this is simply not true. The pandemic plans for Germany can be downloaded from the RKI website and this also applies to many other nations. This is especially problematic when this opinion is stated by health professionals in popular media. We strongly believe that this is not the time for petty criticism but rather the time to follow the guidelines that were set by the experts. Only when every citizen follows the guidelines and fulfils the duties of their specific tasks even more diligently than usual, can we overcome this crisis with the minimal toll to our society.
5. In Wuhan province of Hubei in China, dental interventions were restricted on the 27th of January 2020 to minimise interpersonal contact (<https://journals.sagepub.com/doi/full/10.1177/0022034520914246>). China also applied rigorous methods to make sure the spread of the virus was minimized. Until the 20th of January dental procedures were carried out with regular protective gear; from the 20th on they were performed under the application of special protective measures. In the School and Hospital of Stomatology at Wuhan University, 9 of the 1,926 people working there (1,098 employees and 828 students) got infected, a rate of 0.47%. It is assumed that because of the masks, no further spread of the disease was caused by these infected individuals (<https://journals.sagepub.com/doi/full/10.1177/0022034520914246>.)

A webinar with Prof. Dr. Zhuan Bian, DMD, one of the authors of this paper and head of the School and Hospital of Stomatology at Wuhan University, was moderated by Prof. Dr. med. Dr. med. dent. Bilal Al-Nawas (DGI) on the 25th of March 2020 (<https://covid-19.live-stream-events/?code=jhvsdjfhvasdjfv>). Prof. Bian provided additional information to his paper. He pointed out that the infection rate among healthcare workers in the University (more than 20,000 in several hospitals) only very few were infected (less than 10, see slide: „Infection among health care workers“ at time stamp 1:38 pm). Among all the infected medical and dental staff, the medical personnel suffered more infections and more severe and lethal courses of COVID-19. When asked for the reason why dental staff was less affected, he pointed out that in a dental setting protective gear is common, while in a medical setting and on the wards goggles and masks were not common. Furthermore, he stated that there is no proof that aerosols caused by dental interventions contain an infectious dose of SARS-Cov-2 and that, in his opinion, the clinical reality supports what. Prof. Bian specified: the low infection rate was achieved in his clinic with the use of regular protective equipment, although multiple infected patients were treated. After the lockdown, no new infections were recorded and no further transmission or cross contamination from the infected personal was recorded, a finding that is also explicitly stated in the article and was attributed to the fact that the staff was wearing masks and gloves all the time (paragraph: „current status at our school“ <https://journals.sagepub.com/doi/full/10.1177/0022034520914246>).

As the position paper of the German association for hospital hygiene describes (https://www.krankenhausthygiene.de/ccUpload/upload/files/2020_03_22_DGKH_Mitteilung_Ausgangssperre_RKG_Konzept.pdf), the Chinese measures were a result of the overload of the health system while fighting an unknown pathogen. The question of whether the decision to close dental offices can be transferred to other countries thus has to be questioned, while also taking into account that N95 masks might not really offer better protection in clinical settings than a normal surgical mask <https://pubmed.ncbi.nlm.nih.gov/27754781/>.

C) How we deal with SARS-CoV-2 in our clinic

In Germany dental and medical offices have not been closed and it is up to the practitioner to decide together with the patient what procedures shall be postponed. This decision can also be influenced by an urgent shortage of protective gear.

The number of patients scheduled per doctor has been reduced so that patients do not meet or at least do not come close to each other (eg, in the waiting area). Throughout the day, time slots are kept open so that emergencies can be seen with minimal or no waiting time. Immunocompromised patients are scheduled differently and guided directly into the operatories.

The day before the appointment, patients are called by our staff and possible COVID-19 symptoms over the last 14 days are checked. Every patient is questioned again upon arrival in the office and follows a hand disinfecting procedure.

Every staff member wears a mask at all times within the office. During breaks, the employees are obliged to keep a minimal distance of 2 meters to each other or leave the building. No one ever sees a patient without a mask, cap and goggles. Before treatment, patients rinse with 1% hydrogen peroxide for 1 minute to reduce the pathogens in the oral cavity. During treatment, disposable gowns are worn. Measures to reduce aerosols are taken where possible and strict 4-hand suction protocols are enforced, as these are proven to reduce the contamination by 90% (<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7093851/>). Given that rubber dam isolates the area the dentist works in from the oral cavity, this may further reduce the risk of contamination (<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7093851/>), although sources claim the total amount of aerosol is increased when a rubber dam is used (<https://www.ncbi.nlm.nih.gov/pubmed/?term=The+effect+of+rubber+dam+on+atmospheric+bacterial+aerosols+during+restorative+dentistry>). Given that it is unknown whether one of the effects outweighs the other, the indication to use a rubber dam remains based on the dental procedure.

Before we leave the clinic we remove the clothes and apply disinfectant solution to every exposed part of the skin including the face and the neck. Upon arriving at home all staff members go straight into the shower for a thorough full body wash of at least 15 minutes before we renew our clothing and enter the private areas.

Team leading is incredibly important in these times. We conduct a morning meeting every day to answer the fears and questions of the team. Colleagues with known risk factors for severe COVID-19 progressions were sent to their home office. All staff members have been equipped with surgical masks and disinfectant agent for private use, given that the main risk for infection is outside the clinic.

D) What's next?

This pandemic can only be faced if we act conscientiously and cautiously, but also calmly and with preparation. After the crisis, we have to stand united to tackle the political tasks to make sure we have the means to proceed with the high level of dentistry that is important to our society. Now that society has seen which professions are truly important for its survival, the equipment and salaries of healthcare workers have to be adapted to the standard where it should have been for quite a while. To keep up social distancing, the flow of patients through our offices will have to remain low, and even once a vaccination is ready, this will not solve all our issues. SARS-CoV-2 will be a permanent enemy, as its nature makes variations and mutations likely, and thus in analogy to the flu, revaccinations might be necessary and total protection is unlikely. Now that it is here, there will never be a time without SARS-CoV-2 and COVID-19. The International Classification of Diseases has already been extended for Covid-19. The code U07.1 has changed the world.

Please allow us some finishing remarks:

Do not label yourself and the dental tasks you perform as unnecessary and easily postponable for an indefinite time for patients. In the last decades, the field of medicine has slowly started to recognize dentists as an important medical profession. Don't allow fear and myths to ruin that.

Dentists are specialists for oral health and thus an important cornerstone in maintaining the good medical condition of our patients.

Take care, be safe, care for your team but stay calm and fulfill your duty toward your patients. The reactions of health authorities in this crisis have been sound and as good as possible in the respective national settings. We trust our RKI more than some self-declared Internet specialist, and in our professional careers we never had a reason to regret this. Don't let rumours stir you up.

The word *dentist* translates to German as *Zahnarzt*, or *dental physician* if taken literally. Let us all be dental PHYSICIANS!

Ansbach, 26th of March 2020. Translated and slightly extended on the 3rd of April.
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