Risk Assessment

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Introduction

Before assessing specific questions regarding the field of music below, the authors feel it is important to emphasize that musicians need to comply with the applicable national guidelines, as well as the applicable regulations in the several federal states. These framework guidelines and regulations are subject to constant revision due to the changing development of the Corona pandemic and are made in coordination with the responsible ministries and departments of health (as well as other possible responsible authorities) as applies to the musicians working in different federal states and music institutions.

In this context, it is a challenge to implement the current recommendations of the federal and state governments as they apply to professional groups and situations – especially in the sectors of professional and amateur music, both in classical and popular music. In this context, professional assessments, such as those presented below, are intended to provide information for decisions made elsewhere regarding personnel and institutions.

The scientific data, as a whole, has so far been sparse in the field of Corona virus infection, especially with regard to the specific situations in music performance. We are currently not aware of any specific scientific studies on the transmission pathways of the Corona virus amongst musicians.

The following explanations are based on the application of general scientific findings to the specific situation of musicians. They therefore represent the authors' personal assessments, which to date have not been confirmed by their own scientific investigations. This paper is therefore a snapshot of the current situation, which will be reviewed and revised in due course according to the latest status of existing guidelines and new scientific findings.

The applicable guidelines regarding -- distancing, the ban on physical contact, upper limits for group sizes of persons in indoor spaces, time limits for new contacts, as well as hygiene rules and wearing of face masks in public areas -- are slightly different in each of the federal states in Germany and should be followed accordingly by all persons in music-making situations.

Additionally, musicians in all areas of music should take great care to avoid any contact with others, where possible. If symptoms such as fever, cough or loss of smell and taste are present in such cases a Covid-19 infection should be assumed until the opposite has been proven, even without a positive virus test. In our opinion, if symptoms occur, voluntary quarantining should be carried out even without proof of infection. In cases of a proven infection, entry from another country or contact with a Corona-infected person, the current valid rules for quarantining must be observed. If symptoms occur, you should definitely contact your family doctor.

If children and adolescents take music lessons, parents or guardians should be strongly advised not to send their children to lessons at the first suspicious signs or mild symptoms of Corona virus. Students should also be made aware of this fact. This also applies to teachers who should not give lessons under these circumstances. For older people or those with compromised immune systems due to previous illnesses particularly strict precautions should apply, especially in the area of active musicmaking.

Specific aspects hazardous to singers

Singers in General

In view of the ways in which the virus spreads via the air, the question arises if singers are at a higher risk of infection due to the respiratory activity during singing.

In singing sound is produced by a controlled stream of exhaled air. Physiologically, this sound production is characterised by the fact that this stream of exhaled air is periodically interrupted in singers at the vocal folds (singing and speaking). According to the current state of physiological knowledge, only small amounts of air per unit of time actually escape from the mouth of singers. The air molecules of the air column in the vocal tract are stimulated to vibrate and the sound is transmitted in the room through wave-like vibrations of the air molecules. The extent to which singing leads to increased aerosol diffusion has, to our knowledge, not yet been scientifically investigated.

In addition, singers can also produce considerable amounts of phlegm outside of the sound production process. On the one hand, it is not uncommon to observe increased production of phlegm during warming up, which is then expelled from the respiratory system by coughing or clearing the throat. Likewise, during prolonged singing, increased phlegm production can occur due to overloading of the respiratory tract. On the other hand, increased droplets are produced, as explained in more detail below.

For the reasons mentioned above, we believe it make sense to increase the distancing rule for singers. In our opinion, the distance of 1.5–2 meters, which is valid for the general population, should be significantly expanded for music-making with other people by enlarging it to 3–5 meters, in order to reduce the risk of infection. In addition, in very large spaces, such as concert halls, the risk can probably be further reduced by further increasing the distance and by providing better ventilation.

Solo voice

During solo singing, deep inhalation and exhalation occurs during sound production. The extent to which this increases the risk of infection has, to our knowledge, not yet been scientifically investigated. Even if the direct air flow is not strong in vocal phonation and when breathing at rest the volume of exhaled air is released over a longer period of time, it must be assumed that viruses are spread by aerosols during singing. Furthermore, especially during solo singing, spitting particles, i.e. droplets, are expelled when consonants are formed.

Choral Singing

In choral singing, the physiological principles regarding deep inhalation and exhalation are equally present. Ensemble rehearsals with a larger number of persons are not permitted according to the currently valid regulations (the upper limit varies in the federal states, in Baden-Württemberg (Germany) there is currently an upper limit of five persons).

Even in small choral formations of more than five singers, and even more so in larger choir groups, it can be assumed that the risk of infection is multiplied by the mixing of the air found in the room with the exchange of aerosols in the room that could be contaminated with viruses.

In this case, a Corona infection would have to be reliably ruled out with specific testing of all participants before a choir rehearsal, which is not technically possible at the present time.

For the reasons mentioned above, we feel that choir rehearsals should not take place until further notice.

Individual singing lessons

In our opinion, the risks in individual lessons can be reduced if the safety measures are strictly observed (especially the distancing rule, which in our opinion should be extended to considerably more than the currently valid 1.5–2 meters (we recommend 3-5 meters), and if the room conditions are met (sufficient room size, ventilation breaks of 15 minutes between individual students). However, from this risk assessment, which is based on the current state of knowledge, it cannot be concluded that teachers or students can be obligated to give or participate in individual face-to-face lessons. If the structural and organisational requirements are not met or if the persons involved belong to a risk group, we believe that face-to-face teaching should not take place but would be possible digitally.

Supporting measures for singers

Direct transmission by way of spitting particles can probably be reduced by keeping the distance as large as possible (at least 3–5 meters) and, if necessary, by erecting plastic partitions. Here, sound insulation screens already available in some institutions could also be used provisionally as spitting barriers.

In addition, the risk could probably be further reduced by increasing the distance in large rooms through very good ventilation.

Furthermore, we think it makes sense that teachers and students wear face masks during individual lessons when they are not singing. In this case it is important to ensure that the masks are used correctly in accordance with the rules of hygiene. If protective masks are available for non-medical use, wearing an FFP-2 mask could further reduce a possible risk of infection. During the summer season, we see an additional opportunity to sing and play outside. It can be assumed that aerosols are dispersed more quickly outdoors and therefore the risk of infection is lower.

Appendix

Basic information on the transmission pathways

The main transmission of viruses that cause respiratory infections is via droplets and aerosols. They are produced by coughing and sneezing and are absorbed by the opposite person via the mucous membranes of the nose, mouth and possibly of the eye.

As the Corona virus (scientific name: SARS-CoV-2) mainly affects the respiratory tract, this is also its main transmission pathway: breath, saliva and respiratory secretions. In the field of medicine, it is therefore not surprising to find that an above-average number of ENT specialists have contracted Covid-19 because they perform endoscopic examinations of the mouth and throat area [1].

The spread of the Corona virus as the causation of Covid-19 disease mainly occurs by way of aerosols that carry the viruses through the air. An aerosol (an artificial word from ancient Greek ἀήϱ, English 'air' and Latin solutio 'solution') is a heterogeneous mixture made up of very small particles suspended in a gas.

A Finnish working group centered around Ville Vuorinen at the Aalto University in Helsinki carried out a computer simulation of the dispersion of aerosols in a closed room (supermarket) [2]. According to the simulation, if an infected person expels viruses when coughing, it can be assumed that the viruses will still be detectable in the air after several minutes, even if the infected person has already left the room. Other persons could then inhale the viruses that are still in the air.

According to information from the Robert Koch Institute of 17.04.2020 [3], three studies have shown that aerosols containing coronavirus RNA were detectable in air samples of the exhaled air of patients or in the room air of patients' rooms [4,5,6].

Besides the droplet infection pathway, contact transmission of the virus is also possible. Transmission by way of contaminated surfaces cannot be ruled out, especially in the immediate vicinity of the infected person(s) [7], since reproducible SARS-CoV-2 pathogens can be detected in the environment under certain circumstances [8].

Keyboard instrumentalists – Coaching

For pianists, the risk of contact transmission plays a role when different pianists play the same instrument one after the other. Before and after playing, each player must therefore thoroughly wash his/her hands for at least 30 seconds. In addition, in our opinion, the piano keys themselves should be cleaned with cleaning cloths before and after a person plays.

In our opinion, when coaching care should be taken to maintain a sufficient distance (3–5 meters) between the pianist and the singers. In addition, plexiglass walls can be set up to minimize the risk of droplet infection by spitting particles, especially when coaching singers.

Literature

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