

Dental Practice in the Age of COVID-19: Analysis and Guidelines

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The rapid spread of disease across communities, epidemic and even pandemic outbreaks, have been part of humanity's history since time immemorial. The first fully recorded event took place was in Athens in 430 B.C. and the Bubonic Plague of 1350 [1], provoked the, estimated, death of almost one third of the world's population. A new pandemic was just a matter of time; the question was never if, but when.

COVID-19 (Coronavirus or SARS-CoV-2) appeared in Wuhan City, in the Chinese province of Hubei in mid-November 2019. Following the path of tourism and trade, the virus quickly spread across the globe; within a few months of its detection the virus was confirmed in Asia, Europe and on the American continent. Despite significant debate among the global scientific community on preparedness of humanity for a pandemic, national governments and civil institutions were mostly unprepared. With yet no viable pharmaceutical treatment available, many countries have opted for measures collectively termed as 'social distancing' which has entailed: The closing of schools, the shutting down of non-essential businesses and transport networks and other economically damaging measures, all to slow down the spread of the virus and save human life. Dental practices, among others within the health sector, have had to stop or drastically reduce their activities. Such actions have severely limited what could be described for many practices, as essential treatments.

In such context, it is of paramount importance to seek out and analyses empirical data that reports on how medical institutions in China, other Asian countries and within the EU have faced the outbreak; particularly with regards to how medical practitioners have dealt with this and previous viral outbreaks. The priority is to acquire sufficient scientific data on COVID-19 to delineate the risks of contamination, define and apply a protocol for patient management and decontamination processes. If no vaccine or medical treatments can be found quickly, dental health workers must learn how to coexist with the disease in their daily practice, at least for the foreseeable future [2].

In dental practices, the principal risk is that of the undetected exposure to asymptomatic patients. Although not presenting evident symptoms, they have the same capacity of transmission and the same viral load as symptomatic patients [3]. The incubation period of SARS-CoV-2 is reported as being particularly long and can vary between 2 to 14 days, with an average of 5.2 days [4]. It is important to note that the period of infection most likely starts 1 - 2 days before the onset of symptoms and reaches the peak during the first week of the illness (5 - 6 days) when salivary viral load is at its highest, before declining over time [5]. It would appear that that severe forms of the disease are linked to a patient's immunocompetence and/or time of exposure to the virus at the initial phase of infection. This would imply that a higher viral load can be associated with the manifestation of a more severe form of the disease. Mild forms have the same capacity of transmission than severe but, in that case, the viral clearance is more rapid. It has been observed that a patient's antibody response occurs 10 days or more after onset of symptoms [5].

Another relevant consideration in understanding this disease is the virus's very high transmissibility rate. During the exponential growth phase of the epidemic in Italy, the basic reproduction number (R_0) had a range from 2.76 to 3.25 [6]. The virus appears to spread predominantly through respiratory droplet or contact with infected objects, transmission via ocular surfaces can occur [7] as well as through faecal-oral spread [8]. As with other medical facilities, dental practices can be easily exposed to airborne transmission. Dental facilities are particularly vulnerable due to the risk of aerosol procedures generated on patients positive to COVID-19 during clinical treatment. Unventilated environments, with high levels of viral aerosols, can greatly increase that risk further [9].

By drawing upon studies undertaken in China, specifically at the School and Hospital of Stomatology, Wuhan University [10] and from European dental associations [11] it is possible to construct actionable guidelines for dental practitioners as they attempt to

support patients during the Covid-19 outbreak. The presented 'K-Protocol' below (See figure 1) reflects the significant depth and breadth of available empirical data (around 890,000 patients treated in 2919, 1,098 staff and 828 students) and begins the process of encouraging dental practitioners to exercise caution whilst making a meaningful contribution to dental care and patient health.

Figure 1 (above) illustrates a step-by-step the approach to how to mitigate against the risk of viral exposure, by both patient and the dental practice, before, during and after a single dental treatment. The K-Protocol is summarised as follows:

Figure 1: The K-Protocol.

Source: Author.

- Initial Screening of patient should be done by phone before the appointment. Patients with suspected or confirmed COVID-19 infection should not be treated in a routine dental practice setting.
 - Any staff member with suspected COVID-19 related symptoms or with relative positive should stop working. Antibody tests should be done on health workers.
 - Upon arrival, patients must wear masks, wash their hands and do shoe covering, the waiting area must be ventilated after every patient. Common areas including entry doors, reception chairs and front desk counters, keyboards, phones, hand sanitizer dispensers must be disinfected throughout the day.
 - Dental practices should have a one area for triage and waiting room, where the patient will have their temperature taken and complete screening questionnaire.
 - Front office staff should wear disposable surgical masks, cap, and work clothes when Dental care area staff must be provided with PPE, including disposable FFP2 or FFP3 masks, gloves, gowns, cap, shoe cover, and goggles or face shield.
 - First appointment of the day should be planned for compromised patients (medical condition) and last appointment for higher risk patients.
 - With regards to dental treatments, patient can remove the mask and rinse for 30 seconds with peroxide at 5% [12]. Any kind of aerosol-generating procedure should be strictly controlled. Extra oral radiographies, such as panoramic radiography and cone beam CT, are appropriate alternatives since intra oral X-ray provoke saliva secretion and coughing [10].
 - The use of rubber dam is recommended during aerosol-generating procedures. High-volume saliva ejectors can help to minimize aerosol. Face shields and goggles are essential with use of high - or low- speed drilling with water spray [13]. Anti-retraction dental hand pieces are strongly recommended as an extra preventive measure for cross-infection [14]. Water-cooled hand pieces must be run and to discharge water into a sink or container for 20 - 30 seconds after completing care on each patient and at the beginning of the clinic day. Once the treatment is completed, the patient will wash hands again, put mask and return to the waiting room.
 - Rooms where aerosol generating procedures (AGP) have been performed need to be ventilated 15 minutes with fresh air before cleaning and admitting new patient. If windows do not open a ventilation system functions in a closed circuit, High-efficiency particulate air (HEPA) filtration should be used for the recycled air. After ventilation, dental care areas should be cleaned with a neutral detergent and decontaminated on surfaces using a disinfectant effective against viruses like products with viricidal activity or 0.05% sodium hypochlorite (NaClO).
 - Toilets, bathroom sinks and sanitary facilities need to be carefully cleaned using a disinfectant effective against viruses, or 0.1% sodium hypochlorite. Frequently touched surfaces (doorknobs and door bars, chairs and armrests, keyboards, phone, pay machine, pen, table tops, light switches, handrails, water taps, elevator buttons, etc.) should be cleaned as often as possible (at least daily and if possible more frequently).
- The post pandemic dynamics of the virus will depend of immunity to SARS-CoV-2, the degree of seasonal variation in transmis-

sion, and the intensity and timing of control measures. Until no potential treatment or vaccine will be found, we might be confronted to recurrent outbreaks [2] leading to intermittent distancing that may last until 2022.

Psychological consequences on Healthcare workers are numerous. Anxiety is the most frequent and can lead to weak the confidence in themselves; A viewpoint recently published evidenced main sources of anxiety [15] as access to appropriate personal protective equipment, being exposed to COVID-19 at work and taking the infection home to their family, not having rapid access to testing if they develop COVID-19 symptoms and concomitant fear of propagating infection at work, uncertainty that their organization will support/take care of their personal and family needs if they develop infection, access to childcare during increased work hours and school closures, support for other personal and family needs as work hours and demands increase, being able to provide competent medical care if deployed to a new area, and lack of access to up-to-date information and communication.

From that study emerges the importance for the staff to feel protected, updated and supported. An adequate personal protective equipment (PPE) for each member for the dental practice (Healthcare workers and cleaning staff), a perfect understanding of COVID-19 transmission routes and a psychological support might reduce anxiety, frustration and vulnerability feelings helping them to work in a safe environment and to preserve at its best patient's health. Dental Practice in the Age of Covid-19 has the necessity to coexist with the virus.

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