

*Returning to Dental Practice:
Realistic considerations, Practical solutions
An open letter to the profession, the governing bodies and our suppliers: May 7 2020*

Executive Summary:

- **Attached** is an open letter to the profession, governing bodies and suppliers, which presents an evidenced based approach to the safe re-establishment of face to face oral health care and dental treatment in the UK.
- **It is written** within the overriding importance and context of maintaining the Government's concerns for public health, reducing the R number and maintaining social distancing for as long as is necessary, to ensure public safety and stop the spread of Sars CoV-2, (Covid-19).
- **It is also written** with the overriding concern to protect dental professionals and patients, whilst at the same time being able to provide much needed and overdue care to those patients.
- **Evidence presented supports** the fact that Sars Co-V 2 is in the pharynx and lungs and as a result in saliva, water droplets and dentals aerosols and that dental care providers and patients are potentially at risk of being exposed to it at dental appointments.
- **Logic and evidence presented** supports the notion that dental care providers will need to take extra precautions, before during and after a dental visit in order to ensure patient, Dental Professionals and the public's ongoing safety, from the threat of spreading Sars CoV-2. (Appendix A).
- **These changes** will be necessary until such time as we have: an R number at or near 0, in-office instant testing for antigen and antibodies, protective medication or a vaccine, and more knowledge about the virulence of viruses in aerosols.
- **Evidence presented** and track record shows that the dental profession is well versed and proficient in providing infection control procedures, and as such, can cope with the changes that will be necessary.
- **The viability of dental practices**, sent back to work with strict limitations, such as only allowing the treatment of emergencies or doing examinations, will result in ongoing poor dental care, will not be financially viable and will result in many practices declaring bankruptcy. It will also result in the money the government has spent on furloughed staff to have been a waste and the government will need to realise the 80% bank reimbursement, on defaulted CBILS loans.
- **Sending practices back** to work with added infection control procedures, but without treatment restrictions, (ie: without a phased approach), will allow practices to treat patients properly, will ease the logistical difficulties in setting up and running Urgent Dental Care Centres, will ease the financial burden and risk to the Government caused by practices declaring bankruptcy. This document recognises the unprecedented efforts that The British Dental Association has made to represent our concerns to the Government and governing bodies of our profession.
- **The profession needs a document** outlining the additional Infection control procedures and protocols the governing bodies agree upon. This document should cover all phases of the patient journey and differentiate AGPs from non AGPs as necessary. It should not however limit us to only doing certain procedures. In all cases though, patients considered to have symptoms of COVID-19 or known to have it, should be referred to Urgent Dental Centres, for the time being.
- **The help we need** to allow us to return to work safely is access to appropriate PPE, allowing for prioritisation of front line workers of course. We also need assurances from suppliers, that they will distribute PPE fairly, with rationing, if necessary, to all dental practices. Given the current shortage, the government may need to consider punitive fines for companies who do not distribute evenly and fairly.
- **Updates from the governing bodies**, when research and evidence dictates, as to if and when we can relax the "additional" infection and transmission control procedures.

We write this letter to the governing and decision-making dental bodies in government and the profession and industry as a whole, as group of concerned practitioners. We write it within the context of being helpful both to our patients and the government, as we move forwards and begin to consider restablising face-to-face dental treatment in the UK. But how and to what degree are the big questions.

As the world begins to adapt to the catastrophic effects of the COVID 19 crisis, we as a profession need to plan for the return to the clinical practise of dentistry. We must make every effort to make sure it is safe for our patients, support staff and all dental practitioners to return. We must do this without undermining the protection of the UK public and all of the government's monumental efforts to date, to see us through this pandemic.

During this global pandemic the profession was correctly asked to cease face to face treatment and institute the "three A's" approach of advice, analgesics and antibiotics. This was understandable and valid in the short-term 'lockdown scenario'.

We fear that the long-term implementation of this protocol, will lead to serious 'never' events where dental pain can result in life threatening illness. It is therefore important that we put protocols in place post lock-down, in order to prevent a backlog of odontogenic infections, which are less likely to respond to the repeated prescription of antibiotics.

In early 2020, a study was conducted during this pandemic by Guo et al on 2537 dental patients. They found that the proportion of dental and oral infections increased from 51.0% before the COVID-19 outbreak to 71.9% during COVID-19. There were 38% fewer patients attending for care at the beginning of the pandemic and thus, there is evidence to believe that in the post-COVID-19 era, people's demands for dental services may rise extremely fast. Anecdotally, during the AAA triage period, we are seeing the build-up of problems in our patients that continues to worsen. Although not serious enough to be dealt with by the Urgent Dental Care Centres, they will leave our patients with lasting issues that may never be resolved and affect the long-term health of their oral cavity and possibly general health. This will only get worse the longer practices remain closed.

The return to widespread dental care provision by all dentists, is of the utmost importance.

The UK has made tremendous movement in our battle against COVID-19 and we are now "past the peak", with new cases and deaths falling every day. While we are in the process of "flattening the curve" with the "R" number appearing to be below 1, this is the time to consider our re-entry into the workforce as key healthcare provision workers.

Our profession faces unique challenges, that puts our patients and us at the greatest risk of spreading or contracting the virus, Ge 2020. There is perhaps no other profession that generates as much aerosol from the oral cavity or gets as close to the oral cavity when doing so, than dentistry.

We know that coughing and sneezing, Bourouiba 2020, and even just tidal airflow when speaking, can generate aerosols. Wurie 2013, Sze To 2009, Xie 2007 Asadi 2019. We know that our dental drills, ultrasonic instruments and air/water syringe can add to these aerosols. (Madden 1969, Grundy 1967). We know that these dentally created aerosols are mixtures of, water from the drill or ultrasonic scaler, saliva, blood,

pulverised tooth particles, bacteria, viruses and other microorganisms. (Zemouri 2017). As such we need to understand our challenges and consider what we still need to learn, and consider what equipment will both protect, while allowing us to function and provide care, (Ge 2020). As a profession we must begin to carry out more extensive research especially about the risks of aerosols in the dental practice, particularly when it comes to viruses, viral load in aerosols and virus viability in those aerosols. Currently there does not appear to be any relevant research on this topic (Asadi 2020, Bennett 2000, Nikitin 2014, Guo 2020). Until we know more about this, we must practice in a way that errs on the side of caution.

Our ability to carry out extensive infection control

Dentistry, as a profession, already works within some of the strictest infection control standards. With the introduction of HTM-01-05 (2009, 2013), infection control standards and the overwhelming positive results the CQC finds when inspecting dental practices, provides ample evidence to support this high standard.

However, it is also clear from the evidence emerging about this Sars-CoV 2 virus, that it will pose a challenge to dental practices. By all accounts, (Guo 2020, WHO 2020, CDC 2020, PHE 2020 statements, Chen 2020) this virus, is transmitted through airborne particles, aerosols and fomites. It seems to be more virulent, lingers on surfaces and in the air longer, than other viruses we already protect against. It is found in the saliva and even salivary glands of infected people. This means as a profession, we just need to take our already excellent infection control measures, to an even higher standard. This will involve adding in an extra layer of protection against transmission by aerosols and extending that protection to surfaces, floors and common areas, as described below. (Appendix A)

This is not new to our profession. With the emergence of HIV, we as a profession rose to the occasion and to date the number of patients or Dental Professionals , infected through clinical practise remains near zero, (Hardie 2018).

In the case of the original Sars outbreak, no Dental Professionals or patients were infected (Samaranayake 2004, Yip 2005). There are no reported transmissions of the Mers virus to dental patients or Dental Professionals. Early experience with Sars CoV 2 in the UK from Jan 2020 until shutdown on March 25th, would seem to indicate no reported cases of transmission directly related to the provision of dental care and that was without any extra PPE or precautions, (Peng et al 2020,). Meng et al 2020, reported on their experience in treating 700 dental patients in a Wuhan, China, in a hospital dental school setting, during the early days of the Pandemic (between the end of Dec 2019 and Feb 25th 2020). They reported that there were no known dental professional casualties and no known transmissions to patients treated during the pandemic. Nonetheless, they go on to state “on the basis of our experience and relevant guidelines and research, dentists should take strict personal protection measures and avoid or minimize operations that can produce droplets or aerosols”.

Changes to the provision of dental care going forwards:

The profession is already publishing changed, standard operating procedure documents, (NHS Covid 19 SOPs, ADA interim Covid 19 guidance toolkit and flow charts 2020, Perry et al Straumann communique 2020, Peng et al 2020, Izzetti et al 2020), suggesting the relevant and logical changes that need to take

place in order to allow us to continue to provide dental care. We are being proactive with the interest of our patient's, co-workers and the public at the heart of these recommendations.

Without rehashing those excellent documents, (some of the points addressed can be found in appendix A below), it is clear that until such time as, we have and R number at or near 0, in office instant testing for antigen and antibodies, protective medication or a vaccine, and more knowledge about the virulence of viruses in aerosols, we will need to institute many of these changes.

In the provision of dental care, we will need to make modifications to the entire patient journey in our practices in order to maintain social distancing and minimise the risk of transmission of the disease to other patients and staff, {See appendix A and the aforementioned documents; (Ref ADA interim Covid 19 guidelines and flow charts 2020, Perry et al Straumann communique 2020, Peng et al 2020,) }.

However, one of the main concerns will be trying to reduce exposure to aerosols if an aerosol generating procedure is necessary. Although it would be impossible to eradicate all aerosols, it is possible to mitigate those concerns considerably. It has been shown that it is possible to reduce the bacterial load in aerosols by 94% with pre-procedural mouth rinses (Fine et al 1992). It has been suggested that the Sars CoV 2, may be killed by exposure to an oxidising agent and therefore pre procedural rinsing with hydrogen peroxide 1.5% to 3% should reduce the viral burden in aerosols (Mentel 1977, Peng et al 2020). In addition, when possible the use of a rubber dam during restorative procedures, will also reduce the microbial count in any aerosols by virtue of the fact that you are blocking out all the soft tissues and the throat area. (Harrel SK 2004, Peng et al 2020,). This can result in a reduction of aerosols by up to 70% (Samaranayaka 1989).

The use of high-volume evacuation HVE/suction has been shown to reduce aerosol contamination coming from the operative site by 90% (Harrel 2004)

Masks:

There has been much discussion about what masks we should wear currently.

Should we wear different masks for non-Aerosol generating procedures (nAGP) vs aerosol generating procedures (AGP)?

For nAGPs it has been shown that standard surgical face masks with Visors can be used. Whereas for AGPs, N95 or FFP2 or FFP3 should be considered. Some studies have shown that the standard surgical mask is equal in its effectiveness, against transmission of Influenza virus. Loeb 2009, Radonovich 2019, Long 2020. Nonetheless, the medical repercussion of contracting Sars CoV-2, seems to be far more serious than influenza, and as such, if the government makes sure that we can access the N95, FFP2 or FFP3 masks, then we should use them. Particularly, in light of the fact that other studies do show a superiority compared to basic surgical masks (MacIntyre 2017). In addition considering the evidence that virus sized particles can remain airborne indefinitely, if the room you are in has been used to carry out AGPs, then there will be a daily inherent risk, that the virus can still be inhaled in the room if standard surgical mask is used (Wei 2016). Please Note: Use of all N95 or FFP2 and FFP3 masks must be fit tested.

Overall a layering approach to reducing exposure to aerosols as suggested by Harrel 2004, by incorporating a pre procedural mouth rinses, Rubber dam, HVE, appropriate masks, visors / goggles and now, headcovers, shoe covers and long-sleeved gowns, will significantly limit the possibility to acquire or

transmit the disease. The recent article 'Deaths of NHS staff from covid-19 analysed', (Cook T. et al 2020), shows that cases are lower in anaesthesia and intensive care than other areas of health care, demonstrating that with good practice the risk can be greatly reduced in high risk areas.

Downtime to allow the airborne particles to settle between patients

It has been suggested that the airborne particles in aerosols less than 50 um, may take up to 30 minutes to settle, (Hinds 1982). Therefore, leaving the room to 'air' for 30 min, before wiping down the surfaces would make sense. However leaving it for any longer may make no sense at all, as it has also been shown that particles of virus size and up to 3um, may linger in the air indefinitely (Wei , 2016). This being the case some form of air purifier may make sense with a Hepa filter and possibly UV light (Chen 2010, Hallier 2010).

Research on the virus spread in Wuhan hospitals shows that most particles fall to the ground and the amount of virus found on floors and surfaces was very high. This indicates a likely need to focus on fomite transmission within the dental practice and as such all exposed surfaces will need to be cleaned. Indeed given the high amount of virus found on the floors and the possibility that when the larger droplets with the virus dry they may become airborne again, the floor should probably also be mopped with an appropriate cleaner between patients when an AGP has been done (Liu 2020 , Guo 2020). In addition, shoe covers should be worn in the clinical environment and removed before entering non-clinical environments.

We respectfully ask the governing bodies to consider, that as a profession, we already have a proven track record of protecting the public. We have outstanding infection control compliance and are best placed and practiced, to take on new protocols successfully, to deliver care **now**. We can do this without undermining any of the government's core 5 principles to relaxing lockdown:

- **Making sure the NHS can cope**
- **Evidence showing a sustained and consistent fall in daily death rates**
- **Reliable data showing the rate of infection is decreasing to manageable levels**
- **Being confident in the range of operational challenges, like ensuring testing and the right amount of PPE, are in hand**
- **Being confident any adjustments will not risk a second peak**

We believe that as a profession we are so well versed in our infection control procedures that the changes mentioned below in appendix A and in the referenced, ADA interim guidance and Straumann document, are simply a minor change and addition to our existing policies.

However, in order to return to work, the one aspect we need government and PPE supplier assistance on, is the availability of the correct PPE to practice as outlined below. We fully appreciate that until front-line medical care and therefore PPE demands reduce, the government and suppliers, will not be in a position to offer this to the profession.

Nonetheless, when this time comes, it is imperative that our suppliers distribute the PPE fairly and evenly to all dental practices. As they have done in the past, this may require rationing to all practices be they, NHS, private or Corporate. It would be morally wrong and commercially damaging if the suppliers we

have worked closely with for many years, choose to sell all their PPE stock to only the largest groups and leave the small practices, without the ability to practice because of a shortage of PPE.

Financial concerns/ Implications on the 'phased return to work' policy:

We need to consider how best to create a safe environment to provide care but also to be able to treat/see a reasonable enough number of patients each day, to keep our practices financially viable. Discussing the cost of care is often considered distasteful, but the reality for all of us is the provision of oral health care is already an expensive service to provide. Whilst it is tempting to apply the phased return to "normal" life policy, the government will no doubt institute in the coming weeks and months for the public, we call upon the government, PHE, GDC, CQC, and indemnity organisations to consider the financial impact of such a return policy in the delivery of dental care. Just as our medical colleagues prepare to return to elective procedures, so should we.

Whilst we are all eager to start to care for and treat our patients as soon as possible, if the government applies a phased approach, that only allows us to treat emergencies and/or without the use of AGPs and carry out examinations, there will be no dental practice that can survive financially on that kind of work. The BDA is doing an unprecedented amount of work trying to highlight our concerns to the government and relevant governing bodies. They have conducted a survey that shows that 34% of practices are at risk of going bankrupt as we write this. 70% will not survive 3 months. The implications to the wider delivery and availability of care are serious and this will affect both NHS and private practices. Indeed, private practices have not been eligible for many of the government financial rescue plans. NHS practices are so far in a slightly better position as they have continued to receive government funding. The reality is that private practises help to underpin the NHS, by virtue of the fact that the NHS could not, in its present form, handle the added burden of all the private practice patients, if these practices were to go bankrupt. Approximately 65% of dental care spending, takes place outside of the NHS, which is an indication of just how much care the NHS would need to provide, if the private dentistry sector fails.

That said, the government is nonetheless spending an inordinate amount of time, money and resources on setting up urgent dental care centres, paying for furloughed staff salaries, offering tax delays and backing CBILS loans to 80%. The exposed risk to the government is very high in the case of dentistry. The longer we are restricted from practising to our full potential, the greater the likelihood that the furloughed salaries will have been a waste of money, as we will go bankrupt anyhow. This will result in a significant number of dental practices defaulting on the CBILS loans, requiring the 80% government backing to become realised.

We suggest that as long as the R number does not go above 1, we should be able to practice dentistry in a manner that is safe for the public, our patients and all Dental Professionals. In doing so this would alleviate significant time, resource and financial burdens from the government.

We provide this letter to help the profession in finding a workable solution, that will allow us to safely deliver much needed and overdue care, to our patients and resume normal functioning of the dental industry as a whole.

This letter provides sufficient evidence that at this time point in the pandemic in the UK, and with the available knowledge we have from this pandemic and previous virus-related disease threats, it is now

possible for our profession to return to the full practise of dentistry. With the appropriate new infections control measures put in place, it can be achieved without undermining any of the government's efforts, to gain control of and eventually eradicate the Sars CoV-2 virus.

This has widespread benefits to the government such as reducing logistical and manpower demands on the government and NHS, reducing the financial demands that the government is under, to fund and staff, numerus urgent dental care centres. It limits the number of practices that will undoubtedly need to declare bankruptcy, if they remain closed much longer and thus reduces the risk the government is taking in backing the CBILS loans. Additionally, the entire £11 Billion industry, will once again begin to contribute to the economy. In doing so we can alleviate the suffering of the patients we have spoken to since shutting our doors and save significant time, resource and financial burdens from the government.

This proposal was written with the knowledge that if the "R" number rises above 1 or the infection rate starts to increase significantly or the death rate begins to rise again, we may need to temporarily close again.

In addition, as widespread testing, evidence, research, medications or vaccines emerge, it is essential that these strict new infection control procedures be modified as soon as possible, in an effort to relax them back to pre COVID 19 protocols if at all possible. It must be recognised by all the governing bodies, that practising as described in this letter, is going to be extremely uncomfortable and onerous for both patients and dental Professionals. It will also result in a significant cost increase to the delivery of patient care, due to equipment, supplies and scheduling changes. For all these reasons, we must consider relaxation of these protocols as soon as the science supports this.

Respectfully submitted on behalf of:
Scientific committee of The Alpha Omega Dental Fraternity, London – representing 150 dentists.

Appendix A:

Some changes we will need to address:

- **Pre appointment triage screening**- symptoms question list
- **Scheduling changes** to support social distancing in the practice, staggered appointments, extra down time to “air” the room Schedule AGPs nearer to natural downtime of a treatment room; before lunch or near the end of day. Schedule appointments for vulnerable shielded patients first thing in the morning when the air is cleanest.
- **Patient arrival**- redo triage questions and check patient temperature. Patient washes hands. If patient cannot go straight into the treatment room consider asking them to don gloves and a standard mask if they must go into the waiting room, (Diaz 2010).
- **Physical environment changes** including surface cleaning schedules in non-clinical areas, minimise or avoid the use of waiting rooms, remove any clutter from waiting rooms, remove magazines and drinks, change layout of waiting room to allow for 2m separation, etc (see aforementioned ADA interim Covid 19 guidance toolkit and flow charts 2020, Perry et al Straumann communique 2020, Peng et al 2020, Izzetti et al 2020, documents). Staff to wear clinical clothing and change at the office, shoe covers to be worn by all staff and patients in the clinical areas. Perspex screens, to protect / separate front desk personnel from patients. Shoe cover donning and doffing point for patients and non clinical staff.
- **New PPE donning and doffing protocols** particularly for AGPs. Best practice is to have a separate area to do this. Next best, after procedure, doff all gowns, aprons, gloves, headcovers in the room safely and bag. Do not remove your mask until you have left the treatment room and then do so carefully and either wipe it down or dispose of it. Wear long sleeved water-resistant gowns, headcovers, shoe covers, visors and glasses or goggles.
 - Masks:
Use fit tested, N95 or FFP2 or FFP3 as a minimum for all procedure (nAGPs as well as AGP, due to the risk that virus remains floating in the room for many hours and possible indefinitely, after an AGP. In addition, patients generate aerosols just speaking or coughing and if they have the virus it can linger in the air.
- **In surgery changes:**
All non clinical counters and cabinets in the surgery to be covered by disposable plastic during AGPs.
All clinical counters chairs, stools and equipment to be wiped down with mild bleach or other oxidizing solution as determined by the government and in keeping with manufacturer safety recommendations.
Pre procedural mouth rinses with oxidising agents such as 1.5-3% Hydrogen peroxide.
HVE suction to be used for all procedures
Rubber Dam to be used whenever possible
Consideration for Hepa filter containing air cleaners in treatment rooms with UV if possible and leave on overnight, may be of benefit but studies so far mainly focus on bacteria. (Chen 2010, Hallier 2010).
- **New post AGPs protocols:**
 - Room- everyone vacate for 30 min, open windows to outside if possible
 - Instruments - until further research - first pass in washer disinfector, then sterilize.
If no washer disinfector in the practise, then sterilize, clean inspect then sterilize again.
 - Return to room after 30 min, gloved, gowned and head covered, eye protection and mask and wipe down room and all exposed surfaces.
- **Returning home protocol:** Such as -Do not wear clinic attire home, change shoes, shower immediately.

**Returning to Dental Practice:
Realistic considerations, Practical solutions
An open letter to the profession, the governing bodies and our suppliers: May 7 2020**

Bibliography

ADA 2020 "Interim Covid 19 return to work guidance toolkit and flow charts "

Asadi, S. et al 2020 "The coronavirus pandemic and aerosols: Does COVID-19 transmit via expiratory particles?". *Aerosol Science and Technology*. 2020; 0(0): 1–4.

Asadi, S., 2019, "Aerosol emission and superemission during human speech increase with voice loudness". *Nature*, 1-10.

Bennett, A. et al, 2000, " Microbial aerosols in general dental practice". *BDJ* 2000. Volume 189. P664

Bourouiba L, 2020 "Turbulent Gas Clouds and Respiratory Pathogen Emissions" *JAMA Insights*

Chen C et al, 2010, "The effectiveness of an air cleaner in controlling droplet/aerosol particle dispersion emitted from a patient's mouth in the indoor environment of dental clinics". *J R Soc Interface*. 2010 Jul 6; 7(48): 1105–1118

Chen J. 2020, "Pathogenicity and transmissibility of 2019-nCoV—a quick overview and comparison with other emerging viruses." *Microbes and infection*. Feb 4.

Cook, T. 2020, "Personal protective equipment during the coronavirus disease (COVID) 2019 pandemic – a narrative review" early viewing- 04 April 2020 *Anaesthesia* <https://doi.org/10.1111/anae.15071>

Diaz K T. 2010, "Quantifying exposure risk: Surgical masks and respirators" *Am J Infect Control* 2010; **38**: 501-508.

[Fine, D.H 1992](#). "Efficacy of Preprocedural Rinsing With an Antiseptic in Reducing Viable Bacteria in Dental Aerosols" *Journal of Periodontology*, Vol 63, Issue 10, 821-824.

Guo, Huaqiu et al. 2020, "The impact of the COVID-19 epidemic on the utilization of emergency dental services." *Journal of dental sciences*, 10.1016/j.jds.2020.02.002. 16 Mar. 2020, doi:10.1016/j.jds.2020.02.002

Ge ZY, et al. 2020 "Possible aerosol transmission of COVID-19 and special precautions in dentistry." *Journal of Zhejiang University-SCIENCE B*. 2020 Mar 16:1-8.

Hallier C, et al. 2010, "A pilot study of bioaerosol reduction using an air cleaning system during dental procedures". *Brit Dent J*. 2010 Oct 23;209(8):E14

[Harrel SK](#): 2004, "Aerosols and splatter in dentistry: a brief review of the literature and infection control implications" *Apr*;135(4):429-37.

Hinds WC., 1982, "Aerosol technology: Properties, behaviour, and measurement of airborne particles". New York: Wiley; 1982:6-8.,

Izzetti, R. et al. 2020, "COVID-19 Transmission in Dental Practice: Brief Review of Preventive Measures in Italy" *Journal of Dental Research*. <https://doi.org/10.1177/0022034520920580>

Returning to Dental Practice:

Realistic considerations, Practical solutions

An open letter to the profession, the governing bodies and our suppliers: May 7 2020

Grundy R (1967). Enamel aerosols created during use of the air turbine handpiece. *Journal of Dental Research*, 409-416.

Guo Z-D et al. 2020, "Aerosol and surface distribution of severe acute respiratory syndrome coronavirus 2 in hospital wards, Wuhan, China, 2020" *Emerg Infect Dis.* 2020 Jul <https://doi.org/10.3201/eid2607.200885> (early release)

Hardie, J 2018, "Good News: Dentists Not at Risk of Acquiring HIV/AIDS from Infected Patients and the Illusion of Infection Control" *ORAL Health* 2018

MacIntyre, C. R. et al. 2017, "The efficacy of medical masks and respirators against respiratory infection in healthcare workers" *Influenza and other respiratory viruses* vol. 11,6 : 511-517. doi:10.1111/irv.12474

Madden, W. H. (1969), "Study of some factors contributing to aerosol production by the air-turbine handpiece." *Journal of Dental Research*, 341-345.

Mentel' R, 1977, "Virus inactivation by Hydrogen peroxide" *Vopr Virusol.* 1977 Nov-Dec;(6):731-3.PMID: 203115 (Russian).

Meng, L., et al, 2020., 'Coronavirus Disease 2019 (COVID-19): Emerging and Future Challenges for Dental and Oral Medicine". *Journal of Dental Research*, 99(5), 481–487. <https://doi.org/10.1177/0022034520914246>

Nikitin, N. et al "Influenza Virus Aerosols in the Air and Their Infectiousness". *Advances in Virology.* Volume 2014,

Liu, Y. et al 2020, "Aerodynamic analysis of SARS-CoV-2 in two Wuhan Hospitals." *Nature* <https://doi.org/10.1038/s41586-020-2271-3>

Long, Y. et al. 2020, "Effectiveness of N95 respirators versus surgical masks against influenza: A systematic review and meta-analysis" *J Evid Based Med.* 2020; 1- 9. <https://doi.org/10.1111/jebm.12381>

Peng, X. et al. 2020, "Transmission routes of 2019-nCoV and controls in dental practice" *Int J Oral Sci* **12**, 9 <https://doi.org/10.1038/s41368-020-0075-9>

Perry, et al, 2020 "Getting back to practice: Covid 19 implications on DSO clinic operations and management" *Straumann Communique.*

Radonovich LJ, et al. 2019, "N95 Respirators vs Medical Masks for Preventing Influenza Among Health Care Personnel: A Randomized Clinical Trial" *JAMA.* 2019;322(9):824–833. doi:10.1001/jama.2019.11645

Samaranayake 2004 "Severe acute respiratory syndrome and dentistry: a retrospective view" *Sep*;135(9):1292-302.

Samaranayake, L. P. 1989, "The efficacy of rubber dam isolation in reducing atmospheric bacterial contamination" *ASDC J. Dent. Child* **56**, 442–444 (1989).

Sze To, G.N. 2009, "Experimental Study of Dispersion and Deposition of Expiratory Aerosols in Aircraft Cabins and Impact on Infectious Disease Transmission". *Aerosol Science and Technology*, 466-485.

Wei, Jianjian, and Yuguo Li. 2016, "Airborne spread of infectious agents in the indoor environment." *American journal of infection control* vol. 44,9 Suppl : S102-8. doi:10.1016/j.ajic.2016.06.003

**Returning to Dental Practice:
Realistic considerations, Practical solutions
An open letter to the profession, the governing bodies and our suppliers: May 7 2020**

Wurie, F. O. P. 2013, "Characteristics of exhaled particle production in healthy volunteers: possible implications for infectious disease" *F1000 Research*, 2-14.

Xie, Y. L. 2007, "How far droplets can move in indoor environments - revisiting the Wells evaporation-falling curve" *Indoor Air*, 211-225.

Yip, H.K. 2007 "Knowledge of and attitudes toward severe acute respiratory syndrome among a cohort of dental patients in Hong Kong following a major local outbreak", *Community Dental Health* (2007) 24, 43-48 © BASCD 2007, Received 15 November 2004; Accepted 9 July 2005

Zemouri, C. 2017. "A scoping review on bio-aerosols in healthcare and the dental environment" *PLoS One*.