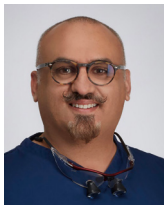

Samy Darwish

Reader advisory: This article was written during the emergence of the COVID-19 pandemic. As the author states, UK and International readers should adhere to official local guidelines regarding the practice of dentistry during this global crisis.

COVID-19 Considerations in Dental Care

Abstract: COVID-19 is a disease that is causing uncertainty with the provision of dental services. The situation is rapidly changing and dentists remain unsure on how to change practices accordingly. Formal guidance remains sparse at the time of writing, so this paper presents matters within the practice of dentistry to be considered, as we adapt to the rapidly-changing need.

CPD/Clinical Relevance: Dentists are unsure what to do and where to look for guidance during this worrying pandemic situation. A structured presentation of matters arising within the practice of dentistry is required for consideration in order to maximize the safety of patients and members of the dental team.

Dent Update 2020; 47: 287–302

As the world prepared to celebrate a turning over of a new leaf for a new decade on 31st December 2019, a low profile unwelcome guest was introduced to the party at Wuhan City in China named COVID-19. Not much notice was initially taken, but the now infamous novel disease seems to have changed the world forever. Initially presenting as a low-grade, flu-like illness, it has now established itself as a worldwide pandemic with far reaching, severe and all-too-often tragic consequences.

Caused by the single-stranded RNA virus, SARS-CoV-2, **CO**rona**VI**rus**D**isease-20**19** has now become more infamous than its previously known cousins, Severe Acute Respiratory Syndrome (SARS) and Middle East Respiratory Syndrome (MERS). Unlike a carrier of the common cold or influenza virus that may infect 1-2 people, an individual with COVID-19 is likely to infect 2-3 people when in direct contact and close proximity.[1] It does not seem to be heavily contagious through breathing, but via contact with droplets or contaminated surfaces that eventually lead to introduction to the body through mucosal surfaces via the eyes, nose and mouth. Many individuals may present with mild to moderate symptoms and may even have no detectable manifestations at all, meaning the community may well have a substantial number of 'silent super-spreaders', some of whom may be our patients. The only realistic method of combatting the spread is to minimize individual-to-individual close contact, frequent hand-washing and sanitization, and to disinfect surfaces stringently.

When symptomatic, COVID-19 seems to manifest as a viral pneumonia presenting as fever, muscle aches and a dry cough with some shortness of breath.[2] It does not seem to present commonly with other often recognizable features of a respiratory infection such as sneezing, runny nose and tearing eyes. The highest viral load has been found to be on mucosal surfaces of the naso- and oro-pharynx.

By the nature of the practice of dentistry, being in such close proximity to patients' faces during operative positions means that dental healthcare workers are particularly susceptible to catching, as well as transferring the virus (Figure 1). In a rapidly changing situation, patients are looking to healthcare providers for particular attention, but the guidance is fluid and variable. At the time of writing, governmental and professional advice for dentists is particularly sparse, as we look for guidance in adjusting our standard operational procedures to suit the changing environment. This has necessitated the need to provide structured commentary, in order to help dentists consider the impact of the disease on the profession and how we should consider our practices.

Service provision

In line with the World Health Organization (WHO) and most governmental organizations, community members remaining at home when possible is the most beneficial method of combatting the

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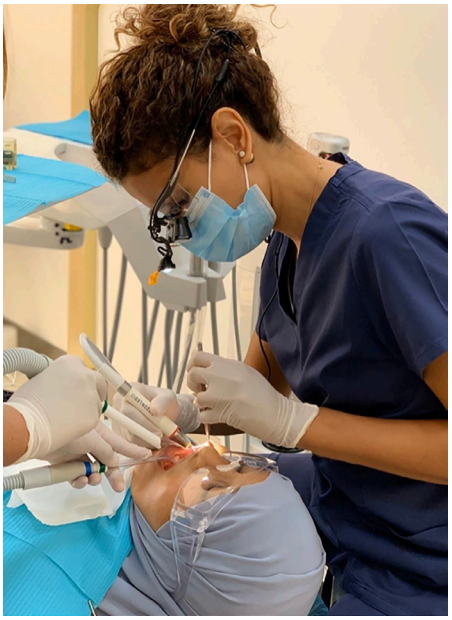

Figure 1. A dentist's operating position is so close to the patient, putting us at risk of catching contagious viruses.

spread of the disease. The government has issued advice to hospitals to cancel non-essential elective surgeries in order to consolidate the workforce and make the use of essential equipment such as ventilators increasingly available, as well as to limit the need for members of the public to leave their homes. The American Dental Association has advised that non-emergency dental treatment should be postponed,[3] but there has been no clear guidance as yet from the British organizations. With this in mind, providers may consider limiting clinical dental services in the primary sector to the essential management of acutely painful conditions or those requiring swift intervention. Examples of such conditions may include the management of acute pulpitis, facial cellulitis, pericoronitis, fractured prostheses and appliances causing trauma, symptomatic hard and soft tissue lesions and conditions, as well as investigations of suspicious-looking lesions. Fractures of teeth and restorations causing aesthetic and functional concerns may be considered to require management of moderate rather than immediate urgency. Alleviating pain and disease progression must remain amongst the responsibilities that dental professionals aspire to provide.

ESSENTIAL V NON-ESSENTIAL DENTAL PROCEDURES

For consideration during a national emergency, to be used as a guide by dentists and professional judgement is encouraged. Risk factors associated with demographics more susceptible to COVID-19 such as the elderly to be considered.

SPECIALTY	PROCEDURE TYPE	ESSENTIAL	NON-ESSENTIAL
Restorative	• **Fillings/Restorations**		
	Mild decay		X
	Moderate decay	X	
	Severe Decay	X	
	• **Fracture tooth repair**		
	Pain or uncomfortable	X	
	No pain or discomfort		X
	• **Crown**		
	For completion of care for moderate to severe decay or to complete RCT	X	
	Proactive replacement of restoration without decay		X
	• **Veneers**		X
Cosmetics	• **Cosmetic procedures**		X
Endodontics	Active infection	X	
	Patient in pain	X	
	Swelling/cellulitis	X	
Emergencies	Any patient with urgent needs	X	
Hygiene	New Patient		X
	Recall		X
	Continuing care		X
Oral Surgery	• **Extractions**		
	Active infection	X	
	Patient pain	X	
	Swelling/cellulitis	X	
	Asymptomatic 3rd molars		X
	• **Implants**		X
Orthodontics	New bandings		X
	Wire or bracket fractures	X	
	Recall		X
	Debond*		X
	*Orthodontist to make judgement on recall time		
Periodontics	• **Initial therapy, debridement or maintenance**		
	Contributory risk factors	X	
	No risk factors		X
Prosthodontics	• **Bridges**		X
	• **Dentures**	X	
Paediatrics	Adult guidelines to be followed		

Table 1. American Dental Association Essential vs Non-Essential Dental Procedures.

It may be worth considering deferring management of non-urgent conditions such as gingivitis, chronic periodontitis, cosmetic dentistry or orthodontics. The author does not aim to make any specific recommendations to categorize urgency of dental conditions but merely encourage an enhanced level of discretion between clinical staff and patients when considering reasons for a dental attendance. A risk-benefit analysis of interfering with advice from government and our medical colleagues in order to attend a dental clinic should be carefully performed. The

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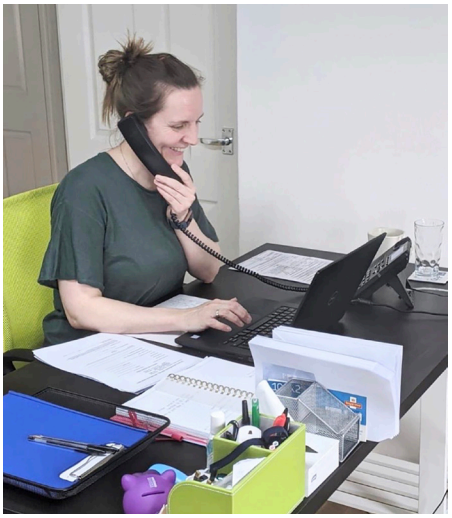

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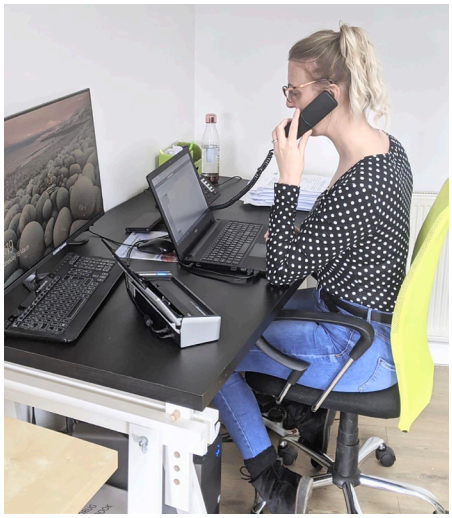

Figure 2. (a, b) Our administration offices where patients are contacted for appointments are not at the reception area.

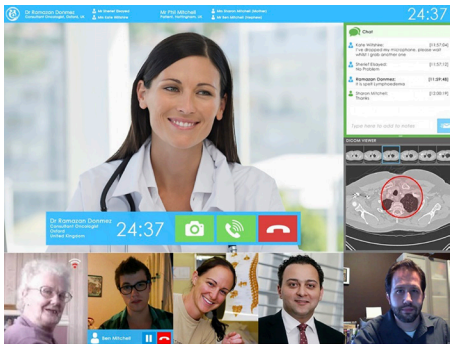

Figure 3. An example of a telemedicine platform, useful for remote consultations.

American Dental Association has published a guide to dentists in categorizing dental procedures according to how essential they may be. This is displayed in Table 1.

The COVID-19 dental patient

Any patient with a positive diagnosis of COVID-19 that requires dental management should be directed to NHS 111 in order to be managed appropriately. Managing such patients independently and without approval in a primary care facility is strongly discouraged. Any individual not in PPE should remain a safe distance of 1–2 metres from the patient and in a well-ventilated area.

Triage

A telephone triage procedure may be performed by an adequately trained member of the clinical and administration team in order to assess vulnerability of patients, as well as a potential threat they may pose to members of the professional team and other patients and accompanying individuals in the building.

A number of vulnerable groups have been identified as susceptible to more severe consequences of the disease and are therefore to be encouraged for a higher degree of self-isolation from the community as long as this does not cause a substantial compromise to their medical or dental health and general wellbeing. These are the elderly patients, in particular over 70 years of age, the systemically medically compromised, in particular the cardio-respiratory compromised and immuno-compromised, and pregnant patients, in particular those in the third trimester. A careful sensitive explanation should be provided to such patients prior to their dental appointments to assist them in making a risk assessment for dental attendance, whilst also being mindful not to eliminate or prejudice against any patient groups regarding their access to dental care.

Patients seeking dental appointments must also be assessed for the risk they could potentially pose to staff of the clinical facility and other attending patients and accompaniers. Patients should be asked if they have recently suffered any fever, flu-like symptoms, or have been in close contact with any individuals with a proven positive diagnosis of COVID-19. Given that the WHO has now declared a global pandemic situation, enquiring about recent travel to any countries or regions considered 'high risk' is no longer of any particular benefit. Categorizing countries according to risk has now been discontinued by the NHS.

Organizing clerical facilities

Reception staff at dental practices are normally the first point of contact for patients. Re-designing a reception desk to have a protruding worktop surface of at least one metre may help achieve an appropriate distance between a receptionist and a patient. Whilst face-to-face contact with patients is often necessary, there are times when it may not be essential. Sensible restructuring of administration facilities may be considered. For example, a member of the clerical team staffing the phones need not necessarily perform this duty at the front desk. Such duties could be performed elsewhere in the premises, therefore minimizing contact with members of the public (Figure 2). Sensible allocation of tasks to staff should take into consideration their own susceptibilities as well as their skill set. For example, a staff member with an underlying cardio-respiratory condition could be deployed to manage the phones in an isolated area, away from exposure to members of the public.

In line with the government's 'work from home if possible' policy, members of the dental team, particularly those performing clerical tasks could consider working from home. Techniques to divert calls to an alternative line at home, and utilizing online communication systems would facilitate such changes in work practices. The author's own healthcare facility is subscribed to a cloud-based patient software system allowing encrypted remote access, therefore allowing clerical staff to reconfigure their work practices and operate from home.

Managing patients remotely

With the recent advancement of telemedicine, innovative techniques could be deployed for information gathering and providing healthcare advice remotely. Conversations can be had by phone, text,

a

b

Figure 4. (a, b) Sanitizers for patients.

emails, videoconference calling or with the use of one of a number of platforms designed for remote healthcare (Figure 3). Any adjustment of healthcare provision that reduces patient contact or negates the need

Figure 5. If possible, the author suggests a new culture of distancing when talking to patients.

Figure 6. Aerosol spray generated from dental ultrasonic scaler (Copyright: Sandor Kacso/Adobe Stock).

for them leaving home may be of particular benefit during the pandemic. With working community members being widely encouraged to work from home, there are a number of aspects of healthcare provision where this may be possible. Particular attention should be applied to making sure that changing innovative practices do not compromise the use of patient-sensitive confidential information. Encrypted information transfer mechanisms must be deployed and all regulatory procedures and legislation must be strictly adhered to. The patient must be carefully consented for such an adjustment in management, and informed in detail on how such a variation would differ from the traditional face-to-face patient contact.

Where patient contact is not entirely necessary, such as with the delivery of a removable appliance for example, a clinician may consider delivering it by post with instructions on use and perhaps a follow-up phone call, rather than asking a patient to attend for a formal fitting.

Patient hand hygiene, sanitizers and habit encouragement

Hand sanitizers, preferably delivered through a sensor-detected, non-touch system, should be made readily available for patients, for example at the reception desk at which they present and throughout the waiting room and facilities. A gentle encouragement to think carefully about touching surfaces as well as the continued touching of faces may help create habits that would combat the spread of disease (Figure 4).

Purchase of oral health products

In order to act in the patients' best interests ahead of financial reward, patients should be discouraged from attending the dental practice if purchasing products, such as toothbrushes and toothpastes, is the only reason for their visit. They should be advised either to purchase such products from the most locally convenient store or ideally purchase them online for delivery.

Clinical and social history-taking

A thorough history-taking process must be performed at every dental visit in order to gather information relevant to the proposed dental management. However, given the current situation, a more in-depth scrutiny of presenting cardio-respiratory compromise or immuno-compromise may be appropriate. A careful social history, including information gathering on domestic arrangements and recent changes in work and living practices, should be taken. Changes in personal arrangements within communities may impact on the logistics of providing clinical care. Although close contact during clinical examination and procedure performing is inevitable, dentists and assistants may carefully consider their distances when

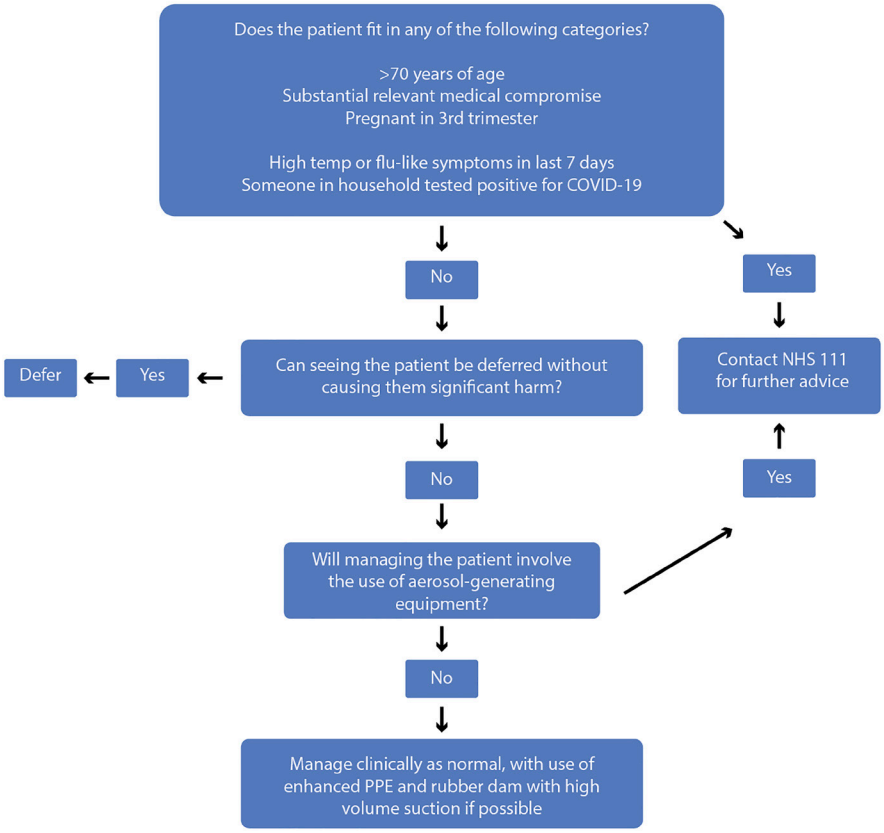

Figure 7. A flowchart may be used as a guide on how to manage dental patients.

history-taking and it may perhaps be time to start considering a new culture of sitting or standing at a distance when communicating with patients (Figure 5).

Adjustment to routine decision-making and techniques

Studies have shown that a substantial degree of circulating and potentially contaminated aerosol-generated water droplets arise from the use of the high-speed turbine, surgical handpieces, piezotomes and ultrasonic scalers.[4-11] (Figure 6). For procedures where rubber dam isolation is possible, this should be strongly encouraged in an attempt to eliminate an inevitable spread of virus-containing saliva and blood.[12] Thorough drying of the isolated tooth surfaces will further help combat fluid spread, although tooth surface and dental material exposure will remain. Where clinically appropriate, the use of aerosol-generating equipment may be replaced with other techniques, such as enhancing the use of excavators and hand scalers. Clinical decision-making may be adjusted with a thorough informed patient consent process when considering deferring procedures, such as the surgical removal of teeth and roots, or the placement of dental implants.

There is some evidence to suggest that oxidizing mouthwashes have been effective in reducing salivary viral load, so it may be prudent to ask patients to perform a prophylactic rinse prior to any operative intervention, as long as there is no known contra-indication for use. Chlorhexidine mouthrinses have been shown to be ineffective in attacking the SARS-CoV-2 virus.[13]

At the time of writing, there has been diametrically conflicting advice due to the lack of high quality data on the use of non-steroidal anti-inflammatory drugs, some reporting that they could worsen the manifestation of COVID-19 symptoms.[14] Caution must be applied when evaluating the evidence and clinical practice should be adjusted accordingly.

A flowchart may be used as a guide on how to manage dental patients (Figure 7).

Personal Protective Equipment (PPE)

Dental professionals are well versed in the use of PPE and the current situation has brought such measures to the forefront of our minds. Careful systematic hand-washing techniques, lasting at least 20 seconds, must be thoroughly performed whilst wearing bare-below-the-elbow clinical attire, if culturally and religiously acceptable. The use of a combination of single-use gloves and mask is of particular importance, together with protective goggles and visors if they do not impede magnifying equipment. There are reports of a shortage of masks in the market, so appointment times may need to be adjusted in order to maximize the use of one mask per patient.

Given the seriousness of the pandemic situation, it is now time to consider more enhanced measures of PPE in dentistry, for example disposable surgical gowns and hats as well as even more advanced forms of PPE such as the use of FFP2 or FFP3 respirators (Figures 8 and 9).

Writing on a recent blog using his twitter handle[15] @johndotz describes, for the purpose of clarity, that a mask is a loose-fitting cloth that is placed over the nose and mouth of the wearer. Contrary to popular belief, he describes that it is not designed to protect the wearer, rather to protect the patient from any coughs and sneezes arising from the wearer, although an element of barrier protection from splatter of saliva and blood is useful. Such fluids could still access the face of the wearer as the mask is loose-fitting. Respirators, however, are tight-fitting masks, designed to protect the wearer from any splatter arising from the patient. The most commonly discussed respirator is the N95 American standard, whereas Europe defines the 'filtering face piece' (FFP) in three standards. Examples of respirators, which also come in a valved or non-valved

Figure 8. Enhanced protective clinical attire.

Figure 9. Full PPE for staff including surgical hat and gown with a FFP3 mask.

STANDARD	Filter capacity
FFP1	80%
FFP2	94%
N95	95%
FFP3	99%
N100	99.97%

Table 2. Filtering face pieces protection levels. FFP2, N95 and FFP3 masks are recommended for the management of COVID-19 patients.

Figure 10. Comparison of mask types.

type, are shown in Figure 10 and the filter capacity of the different masks are presented in Table 2.

How the masks function is beyond the scope of this article and there is as yet no research evaluating their effectiveness in protecting against the SARS-CoV-2 virus. It is known, however, that, as the virus diameter is 0.06–0.14 microns,[16] it moves with Brownian motion, meaning it moves in a zig-zag fashion and therefore gets stuck in the fibres of the mask. In essence, surgical masks are better than no mask at all, but not quite as good as respirators, simply because they are loose-fitting so allow virus particles to pass around the edges. It is easier to breath through a mask with a valve.

The full hood, as shown worn by an Anaesthetist in Figure 11 is considered unnecessary for use in the dental setting.

All used PPE must be safely disposed of in a yellow clinical waste bag with ligation ties, that is placed within a readily accessible bin that is opened with a foot pedal. Donning and doffing of PPE is critical for its successful use, as it is all too easy to make mistakes, such as touching one's face with sterile gloves. Targeted training in donning and doffing techniques, particularly for team members who have limited or no experience in advanced surgical procedures and environments, is essential.

Sterilization and surface decontamination

The author does not consider any measures in addition to the routine decontamination measures necessary, although when frequent stringent practices are performed routinely in front of a community with enhanced awareness in the current climate, the patients may well be further reassured of the safe environment in which they are being cared for. When disinfection measures are regularly visibly deployed in the non-clinical areas, such as surfaces of the reception desks, chairs and door handles, the patient experience is likely to be enhanced further.

Waiting room arrangements

The waiting room should be arranged to minimize patients' and accompaniers' exposure to each other in line with the government's 'social distancing' policy. Where possible, chairs should be positioned at a safe distance and not facing each other (Figure 12). The room should be adequately ventilated and products that may harbour the virus, such as magazines, coffee cups and toys removed from the area. Posters may be placed on the walls displaying public health announcements and advice for patients such as what to do when sneezing (Figure 13).

Information collection mechanisms, such as medical history or registration forms, should be adjusted to minimize contact when utilizing shared use of pens or clinipads, by carrying out stringent surface disinfection techniques. Patients should be encouraged not to bring accompanying friends and family to appointments unless particularly necessary. Appointment times should be

Figure 11. A powered air purifying respirator hood.

a

b

Figure 12. (a, b) In the waiting room, in line with the government's 'social distancing' policy, where possible, chairs should be positioned at a safe distance and not facing each other.

adjusted in order to minimize the chances of over-running, therefore reducing the number of patients in the waiting room.

Domiciliary visits

Vulnerable, 'at risk' patients or individuals who may find difficulty in attending the dental premises due to reductions in public transport availability may benefit from domiciliary home visits or access to local mobile units (Figure 14). For dentists wishing to seize on the opportunity of this changing face of healthcare and diversifying into an alternative approach to dental service delivery, foldable dental chairs (Figure 15) and portable dental equipment (Figure 16) are available on the market. Careful consideration must be given to the required approval of the Care Quality Commission (CQC), regulatory bodies and indemnity providers. Chaperoning, assistance and personal safety also becomes pertinent for careful consideration.

Make every contact count

Whilst tasked to cater for a patient's specific dental needs, according to our training, competence and indemnity cover, contact with a patient may provide a valuable opportunity to investigate their medical and social wellbeing and provide generic care, support and advice to an appropriate level. Any arising concerns could be escalated to our medical colleagues through the recognized access pathways.

Given the global pandemic situation and the drastically increasing number of the population becoming unwell, the clinical environment may provide an opportunity to perform a basic generic medical examination that could include the measurement of systemic body temperature, preferably with a non-contact forehead thermometer (Figure 17) and measurements of vital signs that include blood pressure, pulse, and oxygen saturation. Any concerns must then be relayed to our medical colleagues through the recognized referral and management pathways.

Main stream media, Social Media and community communication

There is one leading topic of discussion and interest in all media outlets and that is COVID-19. The author strongly encourages all dental healthcare professionals to remain closely engaged with all discussions in order to be kept continually updated on a rapidly-developing global situation. Figure 18 shows an example of how dental professionals have taken the lead to communicate with each other. Inevitably, however, there is a vast amount of circulating misleading information, so caution must be applied when receiving information. Furthermore, we must be mindful that we are representatives of the healthcare system within our communities, commanding particular respect when disseminating information relevant to

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Figure 13. (a–d) Examples of patient information posters.

disease. Extreme caution must therefore be applied when communicating information and opinions. If we are not sure about what we are about to post and haven't verified it, it would be prudent not to post it.

Wider community contributions

The healthcare provider is often considered the trustworthy upstanding member of the community. This professional reputation may become particularly valuable during this unprecedented time of community need. There has been no more pertinent peace-time occasion when checking on friends and neighbours, particularly the vulnerable, became of such valuable importance. If situations arise whereby clinical dental services somewhat reduce or diminish, our expertise may be of substantial use within the community, or even in primary or secondary healthcare facilities as an adjunctive member of the clinical team.

Financial, business and personal considerations

There are many relevant fiscal factors that will require careful consideration and implementation. Many dental practices are inevitably seeing a diminishing number of attending dental patients and this is undoubtedly affecting income, as well as the achievement of units of dental or orthodontic activity. Changes in patterns of service provision may well lead to difficult situations that include premises and equipment costs, as well as changes in staffing structure. Difficult decisions may need to be taken. Business proprietors should listen to announcements on the possibility of government support with business rates, mortgages and rental payments. There may be times when the healthcare professional needs support during these difficult times. Any member of staff showing signs of prolonged heightened anxiety during this episode must be supported appropriately, utilizing professional services, if required.

A recognized phenomenon during times of a national crisis is an increase in crimes, as efforts and funding in public services are re-directed. One incident was recently reported to the author when a member of the public entered a healthcare facility and stole a bottle of hand sanitizer and a box of masks, then escaped. Extra vigilance is required during these uncertain times.

Personal health

According to the advice provided at the time of writing, any member of the dental team showing signs or symptoms suspicious of COVID-19, or living in a household where another individual has tested positive, should immediately remove themselves from the workplace, self isolate and perform a test for the virus. Any positive result must then be relayed back to the workplace and to any patients seen during the previous seven-day period. Any members of the team considered vulnerable, such as those with underlying medical conditions or pregnant women, may consider government advice and stay at home. Data from Italy has shown that up to 10% of cases diagnosed with COVID-19 are healthcare workers.[17] Staff shortages during this crisis are inevitable but care must be taken not to allow this to compromise patient and staff safety. Working without assistance or chaperoning, or without required supervision, is strongly discouraged.

There is no better time than the present to concentrate on one's own

Figure 14. Mobile dental van.

Figure 15. Foldable dental chair.

Figure 16. Portable dental unit.

Figure 17. Infrared forehead thermometer.

immune system. Advice relevant to general wellbeing, such as getting good quality sleep, eating healthily and engaging in regular exercise in order to boost immune function applies as much now as ever.

Governance

The situation is fluid and continually changing as incidents occur, advice updated, and information produced through the media or otherwise. A daily morning meeting led by the Governance Lead is particularly worthwhile, where team members can share information and discuss updates to standard operational procedures. This allocated time should be utilized to develop continually and learn from incidents and reports.

The Central Alerting System (CAS) is a useful tool for urgent patient safety communications. Primary care providers should be encouraged to register with the Medicines and Healthcare products Regulatory Agency to receive CAS alerts at **https://www.cas.mhra.gov.uk/Register.aspx.**

The CQC has announced the postponement of routine inspections but particular attention should be applied in order to ensure stringent compliance to governance protocols.

In order to maintain safe social distancing, healthcare professionals may consider subscribing to online distance learning continuing professional development programmes rather than attending courses and lectures with large numbers of delegates. In light of the current need, educational courses relevant to COVID-19 would be advised, such as those that include enhanced cross-infection control.

Conclusion

With the continually changing picture and government advice regarding COVID-19, and the sparse advice from formal dental organizations, this article attempts to provide a structured method of considering aspects of dental care pertaining to service provision. It describes methods of providing dental care to be considered during this unprecedented period of altered community management. Many may be wholly inappropriate when given careful consideration at an individual level, but worthy of thinking about all the same.

Official government guidance must also be continually followed.[18] In much the same way as all professional practice, care must be taken not to stray from official guidance, unless justifiable.

A temporary adjustment to

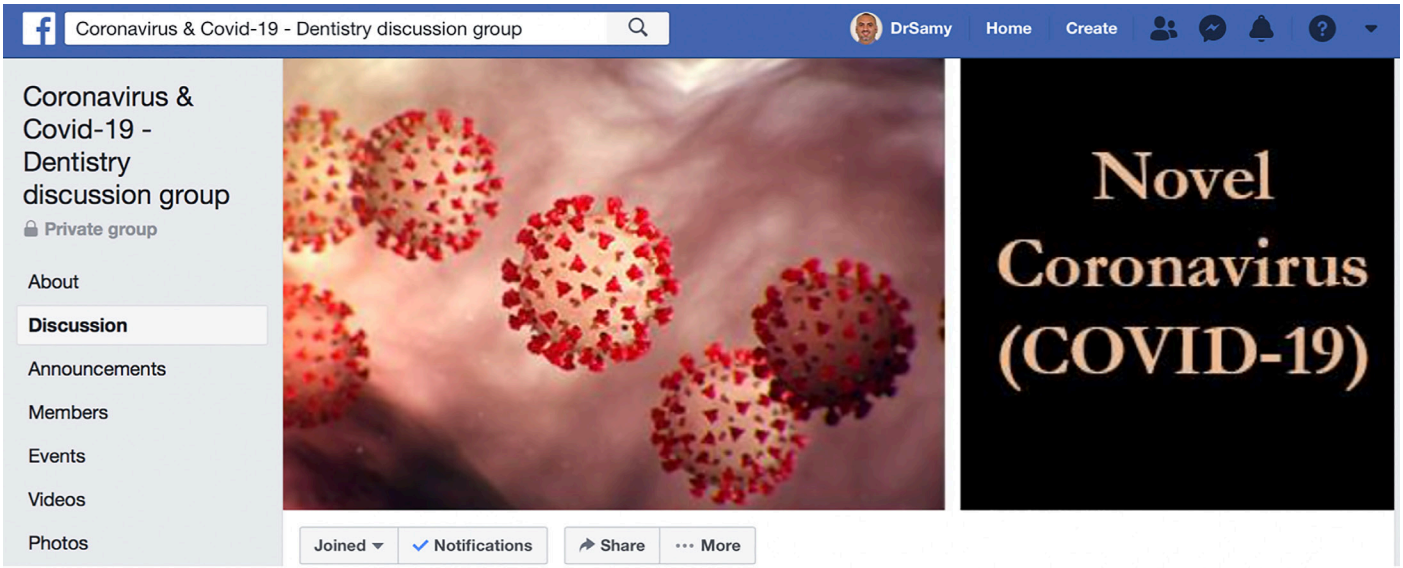

Figure 18. One of a number of social networking pages demonstrating how dentists have taken the lead in sharing information as they develop themselves during these challenging times for the profession.

traditional practices should be considered during these challenging times as we strive to reduce the spread of this world-changing disease. The face of healthcare will inevitably change in response to the current crisis. Our profession must adapt to change our practices appropriately.

Conflict of interest statement

The author has no conflict of interest in submitting this article for publication.

Open access and expediting publication

Given the unprecedented seriousness of the current global situation and the extremely rapidly changing picture, the author requests that review and editing of the article is expedited for swift publication and open access is granted in the interests of safety for patients, professionals and communities at large.

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