Combating Novel COVID-19: Guidelines for the Periodontal Practitioner

Saravanan Sampoornam Pape Reddy1*, Balaji Manohar2, Delfin Lovelina Francis3, Harjeet Singh1 and Balakrishnan Jayan1

1Army Dental Centre (Research & Referral), New Delhi, India
2Principal, Kalinga Institute of Dental Sciences (KIIT Deemed to be University), Bhubaneshwar, India
3All India Institute of Medical Sciences, New Delhi, India

*Corresponding Author: Saravanan Sampoornam Pape Reddy, Army Dental Centre (Research & Referral), New Delhi, India.

Received: March 22, 2022; Published: March 30, 2022
DOI: 10.55162/MCDS.01.015

Abstract

In the history of medicine there have been many outbursts of morbid infectious diseases and it is challenging to every health care professional to reduce and prevent its burden. The field of Dentistry is always a source of high-risk infectious material generation owing to its professional nature. Most of the morbid infections are viral in origin and quite often transmit via droplet or aerosols. In this context, the field of Periodontology is not an exception. The recent pandemic spread of novel corona virus infectious disease (COVID-19) is alarming the community and has gained focus in terms of prevention at each echelon in the chain of transmission of infection. It becomes a mandatory duty as responsible clinicians in combating against the spread of such an infection.

Keywords: COVID-19; Periodontal guidelines; Periodontal color coding

Key messages: It is well known that universal precautions be applied in day-to-day periodontal practice. In addition, specific precautions are recommended to Periodontists in terms of patient management protocols at various phases of periodontal treatment.

Introduction

The incidence of global pandemic caused by the novel coronavirus is alarmingly increasing in India. The rapidity of development of clinical illness and difficulty in management poses a significant challenge to the specialists. The infection is caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2). The first case of this pandemic was reported in Wuhan, China and vastly spread across continents of the globe. With the given scenario of spreading infection, dental professionals are at high risk for hospital acquired infections (HAIs) and thereby becoming a potential carrier in future. The unique nature of periodontal therapy involves extreme aerosol generation, sharps handling and close proximity to Oro-nasopharyngeal droplet foci, which raises the need for the specialists to modify the existing periodontal treatment modalities for counterbalancing the pandemic situation. The aim of this review is to provide an overview of prevention of transmission of infection during the present public health emergency of global concern, corona virus (COVID-19) infection.

Problem background

India had been affected in the past by pandemic of plague leading to Black Death and even swine flu. Presently, our country is effectively fighting another unprecedented pandemic, COVID-19 caused by SARS-CoV-2. It was already recognized in the past that social distancing is an effective way to reduce the impact during such situations. However, there always remains a submerged portion of the ice berg of cases, who are asymptomatic carriers of the virus. Hence, the periodontal professionals need to be very effective in combat-
Combating Novel COVID-19: Guidelines for the Periodontal Practitioner

The identification, differentiation, preventing transmission and breaking the chain of infection, given the burden of high intensity in densely populated country like India.

**Overview of SARS-CoV-2**

CoV-2 is a single stranded RNA Virus belonging to the family of beta corona virus and acts through structural spike protein (S protein) which interacts with Angiotensin Converting Enzyme-2 (ACE2) receptors located in lungs, intestine and salivary glands. The virus enters the host cell through S protein and synthesizes the viral RNA. The novel COVID-19 infection has an incubation period of 0-24 days and spreads via droplet infection, aerosols, fomites and faeco-oral route. It is presently very difficult to predict the transmission potential of the virus as it undergoes self-mutation [1]. Therefore, in addition to the routine universal precautions, special mandatory protocols are to be adhered during periodontal care. Periodontal therapy involves various phases of treatment and each stage has its own implications in infection control protocol.

**Preparation of the periodontal clinic**

The clinic should exhibit info graphics pertaining to CoV-2, cough etiquettes and prevention of COVID. The operatory always holds a potential risk of contamination by aerosols (0.001μm), droplets (10μm) and splatter (greater than 100μm) [2]. Thus, it becomes mandatory to daily disinfect all the surfaces using virucidal disinfecting agents like 1% Hydrogen Peroxide, 0.2% Povidone Iodine, 70% or more Iso-propyl alcohol and 1% Sodium Hypochlorite (NaOCl). A two-minute exposure to 1% NaOCl to was found to be effective for viral inactivation [3]. A study which investigated 0.01% NaOCl and ethanol for dental waterline disinfection concluded that, 0.01% NaOCl was effective in inactivation of most infectious agents including viruses. Such a low concentration of NaOCl in dental waterline was well tolerated by the patients as well [4]. But it has to be mentioned that the exact action of NaOCl on viruses is still unknown. It was shown that CoV2 can survive on inanimate surfaces from 2h to 9 days, especially when the relative humidity is 50% or more [5]. It is suggested to maintain a dry clinical environment avoiding the usage of air conditioners. Invariably all the instruments have to be sterilized only by autoclaving since it is known that viruses can retain their infective potential over fomites for many days [6].

The periodontal clinic should have a standardized operating protocol (SOP) and also should ear mark one staff as the Infection Control Officer (ICO). The entire periodontal team should be well versed with all the contents of the SOP. The SOP is a dynamic document and has to be updated time to time with the latest evidence available. The ICO shall ensure that the periodontal team undergoes daily temperature screening using noncontact infrared thermometer before entering the clinic and all the protocols of SOP are being followed. A daily emphasis of the donning – duffing drill in specific order as mentioned in the SOP has to followed. The reception, waiting area and operatory may have air purifiers/UV light disinfector/HEPA filters whenever feasible, however evidence on the same is inconclusive. The seating arrangement in waiting area should be specifically designed to maintain inter-personal distance of at least 2meters. The belongings of the patient should be be deposited at reception in sealed disposable covers.

**Patient registration**

According to Indian Dental Association recommendations all the attendees of the periodontal clinic should follow the hand washing protocol with soap and water or with alcohol-based hand sanitizer before registration. A detailed step by step info graphic of hand hygiene should be displayed. The patient and the visitor should be emphasized to wear face mask irrespective of their COVID/medical history, if not wearing a mask already, the same shall be issued at entry point. It is suggested to do digital registration and online payments using smart wireless gadgets thereby avoiding usage of stationery which is difficult to disinfect. The temperature of both patient/attenders has to be evaluated using a non-contact infrared thermometer [7].

**Screening forms**

All the patients and their accompanys should be allowed to do the documentation as follows;

(i) Complete demographic details of both patient/attender as a measure to achieve contact tracing as and when required.

(ii) Travel / Contact history questionnaire
(iii) Self-medical history declaration for specific symptoms
(iv) The existing consent form for patients has to be modified providing the details of risk of CoV-2, being a significant medico-legal implication to the periodontist.

**Preparation of the patient**

All the patients should invariably be prepared using personal protective equipment's (PPE) including disposable patient gown, disposable hand gloves, head cover and shoe cover. Proper draping and extraoral skin preparation using 5% povidone-iodine or alcohol based chlorhexidine (CHX) is mandatory. A preprocedural mouth rinse reduces the bacterial load of oral cavity being a potentially contaminated aqueous environment [8]. Although CHX is considered as the gold standard mouth rinse, the effect of the same on CoV-2 is unknown. It has been shown that 0.2% Povidone – Iodine or 1% hydrogen peroxide was found to be effective in 94% reduction of the oral viral load. A 0.05% NaOCl mouth rinse resulted in significant reduction in plaque formation, however effect of the same on CoV-2 is unknown [9].

**Preparation of the personnel**

Ministry of Health and Family welfare recommends that all the personnel involved in emergency medical relief should undergo proper hand washing, scrubbing and donning-duffing protocols with necessary PPE [10]. The PPE includes four levels of protection and their applicability based on the trade work is depicted [Table 1] [11]. The COVID risk scoring and the implications of PPE levels are presented [Table 3]. It is obvious that the comfort level will be affected with full level PPE (Level A), but the same is indispensable in the present pandemic situation.

<table>
<thead>
<tr>
<th>Level</th>
<th>Protection needed</th>
<th>Components of PPE</th>
<th>Applicability to Periodontal Team</th>
</tr>
</thead>
<tbody>
<tr>
<td>Level A</td>
<td>Highest level of respiratory, skin, eye and mucous membrane protection</td>
<td>Positive pressure respirator with exhalation control (N95 mask), face shield, full body encapsulating suit with inner and outer gloves, boots with shoe cover</td>
<td>Periodontist</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Dental Hygienist</td>
</tr>
<tr>
<td>Level B</td>
<td>Highest level of respiratory protection and lesser skin, eye and mucous membrane protection</td>
<td>Positive pressure respirator with exhalation control, (N95 mask), face shield, chemical resistant clothing, head cover, inner and outer gloves, boots with shoe cover</td>
<td>Operating room assistant</td>
</tr>
<tr>
<td>Level C</td>
<td>When skin and eye exposure is unlikely</td>
<td>Full face mask / Triple layer surgical mask, chemical resistant clothing with inner and outer gloves and boots</td>
<td>Housekeeping staff</td>
</tr>
<tr>
<td>Level D</td>
<td>When working precludes aerosols, splatter, droplet sources</td>
<td>Triple layer surgical mask, Coveralls, hand gloves and safety boots</td>
<td>Receptionist &amp; Clerical staff</td>
</tr>
</tbody>
</table>

*Table 1: Levels of personal protective equipment.*

**Periodontal management**

As per Center for Disease Control (CDC) criteria, all the periodontal patients who present with suspicious respiratory symptoms shall be deferred from all forms of elective periodontal treatment up to 3 weeks [12]. A periodontal procedural color coding is proposed to effectively combat the pandemic situation [Table 2]. The ‘grey zone’ depicts the COVID risk scoring criteria and if the total score is 3 or more should alarm the periodontist and the treatment has to be deferred for next 21 days. Later, the periodontal treatment should only be performed after an opinion has been obtained from physician. Hence the suggested ‘cut off’ risk score for performing periodontal treatment is 2. The periodontal treatment color coding proposed in this model are green code, amber code and red code. All the codes
Combating Novel COVID-19: Guidelines for the Periodontal Practitioner

of periodontal treatments can only be safely performed only if the risk score is 2 or less and with extreme precautions as coded in the levels of PPE accordingly [Table 3]. The ‘green code’ of procedures implies all the procedures which can be performed safely without compromise in the aseptic protocols. The ‘amber code’ of periodontal procedures should be performed with caution, only if absolutely necessary for the benefit of the patient and with highest level of PPE possible. The ‘red code’ of periodontal procedures should ideally be postponed during the pandemic situation.

<table>
<thead>
<tr>
<th>COVID Risk Scoring</th>
<th>Periodontal Procedure Coding</th>
</tr>
</thead>
<tbody>
<tr>
<td>Travel history</td>
<td>Periodontal examination including probing</td>
</tr>
<tr>
<td>Score 1</td>
<td>Hand scaling / root planing</td>
</tr>
<tr>
<td>Body pain / Fatigue</td>
<td>Local drug delivery</td>
</tr>
<tr>
<td>Score 1</td>
<td>Medical co-morbidities</td>
</tr>
<tr>
<td>Score 1</td>
<td>Sore throat / Cough</td>
</tr>
<tr>
<td>Score 2</td>
<td>Breathing difficulty</td>
</tr>
<tr>
<td>Score 2</td>
<td>Fever Score 2</td>
</tr>
<tr>
<td>Contact history</td>
<td>Review examination for SPT</td>
</tr>
<tr>
<td>Score 3</td>
<td>Teleconsultation for SPT</td>
</tr>
<tr>
<td>Previous history of</td>
<td>Extra oral imaging</td>
</tr>
<tr>
<td>Covid-19 Score 3</td>
<td></td>
</tr>
<tr>
<td>Present Covid illness</td>
<td>Oral health education using online tools</td>
</tr>
<tr>
<td>Score 5</td>
<td>Present Covid illness</td>
</tr>
<tr>
<td>Total score more than 3, Postpone all types of treatments</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Self-assessment of oral hygiene using plaque disclosing agent</td>
</tr>
<tr>
<td></td>
<td>Smoking cessation counselling</td>
</tr>
</tbody>
</table>

Table 2: Periodontal procedural color coding in COVID-19.
Combating Novel COVID-19: Guidelines for the Periodontal Practitioner

<table>
<thead>
<tr>
<th>'Grey Zone'</th>
<th>'Green Zone'</th>
<th>'Amber Zone'</th>
<th>'Red Zone'</th>
</tr>
</thead>
<tbody>
<tr>
<td>Score more than ≥ 3 – as Red zone</td>
<td>Safe zone</td>
<td>Caution zone</td>
<td>Danger zone</td>
</tr>
<tr>
<td>Score less than ≤ 2 – as Green zone or Amber zone as applicable</td>
<td>Level A PPE for Periodontist / DH</td>
<td>Level A PPE for Periodontist / DH/ Operating room assistant</td>
<td>Postpone all types of treatment</td>
</tr>
</tbody>
</table>

Table 3: Color coding – Risk zones and their implications.

It is understood that periodontal treatment is a never-ending process since the therapy in a diagnosed periodontitis patient continues for lifetime of the patient. Hence, provision of routine periodontal care during the ongoing pandemic seems illogical. The primary moral response is to save lives and to contain the infection. However, it becomes imperative that the periodontist be prepared with specific modifications to prevent and control the spread of COVID-19. Periodontal emergencies like acute gingival/periodontal abscess, acute periapicalitis, necrotizing ulcerative gingivitis (NUG), herpetic gingivostomatitis should be managed with extreme precautions following risk evaluation and PPE protocols. In emergency phase, incision and drainage of abscess, root canal opening with micro motor under rubber dam or chemical caries removal may be performed. For emergency patients, who require initial therapy as in NUG, it is recommended to use hand instruments and perform only supragingival scaling. Systemic antibiotics in the pre-operative phase should be reserved only to patients who present with systemic signs of periodontal infection [13]. Extraction of hopeless teeth being a non-aerosol producing treatment can be performed only if the risk score is ≤ 2. All the elective cases of initial therapy should be preferably postponed, considering the concrete data that, in a cohort with absolutely no oral hygiene measures, only 8% of the population without periodontal care showed severe attachment loss over a period of 15 years [14]. Studies showed that ultrasonic scaling is superior to hand scaling in terms of flushing action, endotoxin reduction and time consumption [15]. Although most patients (74%) show a strong preference to ultrasonic scaling, it is absolutely contraindicated because of the huge risk of transmission of infection through aerosols, droplets and splatter [16]. With the available evidence it is found that both ultrasonic scaling and hand scaling can efficiently interrupt biofilm formation with no significant difference between the two when performed efficiently [17]. For those patients who had already completed initial therapy, shall be continued on prolonged maintenance phase, as it is evident from the literature that the success of periodontal therapy depends on the quality of periodontal debridement rather than surgical or non-surgical technique used [18]. All other patients who are due for surgical therapy and restorative therapy should invariably be postponed, unless warranted by an extreme urgency which is nearly zero in periodontal practice. In such a rare necessity, closed curettage using hand instruments is preferred to open flap debridement. In a study, which compared curettage with osseous recontouring, it was found that there was comparable improvement in periodontal health with both the techniques [19]. All the restorative procedures which necessitate operation of aerosol producing instruments should definitely be postponed. For patients who were due for maintenance phase should preferably be managed with a telephonic consultation or video conferencing to provide essential home care advice thereby avoiding the visit of such patients to periodontal clinics for supportive treatment. For select situations of maintenance patients (whose risk score is ≤ 2) in whom the sites which present with continuing attachment loss, should be treated locally using area specific hand curettes and local drug delivery may be administered if the probable pocket depth is ≥ 6mm [20].

Periodontal care in relation to COVID-19 patients

Ideally periodontal treatment in an active COVID positive patient has to be postponed. In case of a recently recovered COVID patient, the periodontal treatment should be postponed for at least 6 weeks from the date of recovery. When a recently recovered COVID patient is encountered all the staff has to be notified and contact log has to be updated. All the staff who came in contact with such a patient should be quarantined for minimum of 14 days after such notification. Isolation in a hospital will be necessary if symptoms develop. Fumigation using 12% Hydrogen Peroxide with 0.02% Silver Nitrate or with 35 ml of formalin in 10gm of Potassium Permanganate per 5 square feet is mandatory after an encounter with positive or recently recovered COVID patient, even if no periodontal treatment was performed. The periodontal clinic should remain closed after fumigation and should not be opened before 48 hrs. In case of unprotected exposure, administrative and local health authorities have to notified immediately and self-quarantine is strongly

recommended along with wearing of protective masks even during the quarantine period. For all the periodontal patients who were "close contacts" of a known COVID case, any form of treatment should be postponed as the COVID risk score becomes 3. There is a dilemma, when it comes to periodontal management of asymptomatic patients (recovered cases who do not present history or asymptomatic carriers) as the infectivity of such patients is unknown. In such cases, when in doubt, treatment should be postponed and only when unavoidable it has to be modified as suggested green zone [Table 2].

**Laser and Radiosurgery**

As a sole procedure laser have shown 'minimal evidence' in periodontitis management and a position statement concluded that the results are unpredictable and inconsistent when used as a monotherapy [21]. In addition, the application of laser and electrosurgery leads to generation of ‘plume’ [22]. Such smoke was shown to transmit viral DNA [23]. Hence a high vacuum suction is indispensable with laser / electro surgery and it is presently uncertain whether CoV-2 can be transmitted through the plume. With the present available evidence, it cannot be ascertained, as whether lasers or electrosurgery offer a safe treatment alternative to conventional periodontal treatment modalities.

**Piezosurgery**

Piezoelectric devices work on the basic principle of ultrasonics. The advantages of piezosurgery such as greater visibility, reduced bleeding is due to the ‘cavitation effect’ because of ultrasonic micro vibrations [24]. Hence, they are absolutely contraindicated because of the risk of transmission of infection through generated aerosols.

**Implant Surgery**

Recently, a retrospective cohort study was done to review the clinical outcomes of various surgical procedures of varying complexity in patients who were asymptomatic prior to surgery but with a direct exposure to Wuhan city. All the patients quickly manifested clinical features of COVID-19 immediately after completion of the surgery suggesting that, surgery may accelerate and exacerbate disease progression [25]. It was highlighted that patient’s immune function is one of the major determinants of outcome in Cov-2 infection [26]. It is well known that a surgical procedure can trigger a systemic inflammatory response and can cause transient impairment of the immune function. Hence it is suggested to avoid all implant surgical procedures however, for patients who require exposure of previously osseointegrated implants at second stage, can be performed if the risk score is ≤ 2.

**Post-operative medications**

The analgesic of choice for most periodontal patients is acetaminophen and it is advisable to avoid ibuprofen according to CDC as the drug interferes with immune regulation [27]. It was known that the rate of post-operative periodontal infections was only about 2% on an average [28]. Hence, post-operative antibiotics for infection prevention should be prescribed judiciously and usually the requirement is less when all the aseptic protocols were followed.

**Periodontal viruses and CoV2**

Traditionally periodontitis was earlier considered as a bacterial infection. With the unexplainable reasons for site specificity of the disease other etiological agents including viral etiology in periodontal disease was elucidated. By invasion, replication inside the host cells, the viruses are able to alter the host immunity of the periodontal tissues. Latency is a characteristic feature of viruses and leads to reactivation / recurrence of lesions [29]. At present, it is unknown, whether CoV-2 can cause infiltration and invasion into the periodontal tissues from the saliva of COVID-19 patients.

**Prophylaxis against COVID-19 for periodontal team**

Presently there are numerous ongoing drug trials for COVID prophylaxis among health care workers (HCWs). At present there is no clear-cut scientific evidence to support the use of hydroxychloroquine (HQ) prophylaxis in HCWs. However, the rationale for its use
in clinical trials is based on the in-vitro ability of HCQ to inhibit viral replication. The FDA authorized the use of HCQ only in diagnosed COVID-19 case and not for prophylaxis in HCWs until further evidence. Only randomized controlled clinical trials will be able to show us the efficacy of HCQ for COVID prophylaxis [30]. The periodontal team should consider prophylaxis with HCQ only after seeking advice from physician who might advise the same based on the emergence of day-to-day evidence. Until then, a strict aseptic protocol along with a modified periodontal approach with all necessary precautions should be adhered to.

**Post treatment of the periodontal clinic**

Surface disinfection as in preparation of the clinic has to be repeated. It is known that operation theatres (OT) with laminar flow patterns definitely reduced the micro-organism laden aerosols by sixty times when compared to conventional OT [31]. The periodontal clinic is a minor OT which carries high risk of airborne infection of the ongoing pandemic. It is suggested that daily fumigation of the operatory is necessary in clinics in which OT ventilation system is not installed. The appointment scheduling of periodontal patients has to be taken care of, considering the minimum time required for fumigation process [32]. The Biomedical Waste Management Rules, 2016 has to be followed along with usage of double layered bags to ensure no-leaks during waste disposal [33].

**Cost effectiveness**

Considering serious concern of the pandemic, a ‘modified layering of protective procedures’ is suggested for the periodontal team during all the phases of treatment as depicted (fig.1) [34]. The total cost of periodontal treatment is likely to escalate in near future, but the overall benefit definitely outweighs the risks involved, given the high mortality of COVID-19. At present many organizations are being commissioned to develop cost-effective PPEs without compromise in the quality and safety. As on date, there is no universal consensus on retreatment and reusage of PPE. As an interim measure to combat the emerging rise in infection rates, CDC recommends that, the dental treatments are to be prioritized and the clinician should be the decision maker on individual patient basis. Hence it is suggested that periodontists should be regularly updated with the recommendations that will likely emerge as the pandemic evolves during forthcoming several weeks to months as directed time to time by CDC, Ministry of Health and Family Welfare and other professional and specialty governing bodies [35].

**Mental robustness**

The rising pandemic situation and the existence of potential asymptomatic carriers, latency and reactivation of CoV-2 creates insecurity to the practitioners. The efficiency of mental aptitude reduces in periods of anxiety, fear and stress. Nevertheless, studies showed that pandemic preparedness can be achieved by efficient training and willingness to work and was directly proportional to stewardship and robustness [36]. Such mental anxiety can be gradually diminished by effectively practicing the necessary aseptic protocols.
Conclusion

Periodontal therapy is an integral part of routine dental practice. The purpose of this review is to throw light on the modification of standards of treatment and protocol to be adhered in daily periodontal practice. There is high calling for practicing periodontists to act prudently to protect their patients and themselves and their staff members, by maintaining high standards of infection control. There is a torrent of scientific evidence pouring in everyday on COVID-19 and the recommendations change in accordance with the rapidly evolving pandemic situation. It is necessary that all health professionals who are warriors in frontline shall keep themselves updated with the current knowledge, to effectively combat the emerging crisis and keep themselves and their team safe and also provide safe and effective patient care throughout.

References

Combating Novel COVID-19: Guidelines for the Periodontal Practitioner