

Perspective

Can Supportive Periodontal Therapy Curbe the Surge in COVID-19?

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The advent of new variations and the outbreak of pandemic COVID-19 has pushed research among global health professionals to limit the spread of the coronavirus through periodically updated norms and standards of preventive treatment. Dentists have been limited in their practice to emergency care since 2019, as salivary droplets and infectious aerosols from asymptomatic carriers can cross, contaminate the environment. Exaggerated immune responses in patients with poor dental hygiene act as a double-edged sword, manifesting clinically as increased periodontal pockets degrading the tooth supporting tissues, tooth mobility, and tooth loss. SARS-CoV-2 has been discovered in the dental biofilm of infected individuals, according to recent research. Deep periodontal pockets have been identified as a favorable niche for viral survival. This article covers some current study updates and highlights the significance of educating the public, particularly the older population, about maintaining good oral hygiene and minimizing COVID-19 transmission through supportive periodontal treatments.

Keywords: COVID-19; Periodontal disease; Dental biofilm; Antimicrobial agent; Supportive periodontal therapy

Abbreviations

COVID-19: Coronavirus Diseases-19; SARS CoV-2: Severe Acute Respiratory Syndrome Coronavirus-2; ACE2 receptors: Angiotensin-Converting Enzyme 2 Receptors; CPC: Cetylpyridinium Chloride; PVP-I: Povidone-Iodine

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COVID-19 was first reported by the World Health Organization in late December 2019 in Wuhan province, China. According to recent findings, the number of undiagnosed cases in specific areas are constrained to well-defined clusters related by time, geography, and common exposures [1]. Reports stated that present atrocious effect of the second and third waves may possibly hit the population who have rescheduled appointments with the health care facility for their chronic diseases due to fear of COVID-19, non-vaccinated individuals, population affected by economic recession and social backward population [2].

Common clinical symptoms of COVID affected patients include fever, cough, fatigue, dyspnea, myalgia, sputum production and headache, prove to be fatal when progress to severe organ damage and pneumonia [3]. Oral clinical symptoms such as gustatory dysfunction, xerostomia, sialadenitis, periodontal disease, desquamative gingivitis, herpetic ulcers, and cervical lymph node enlargement associated with other dermatological symptoms were also reported [4]. However, there is inadequate scientific data to support the pathogenic mechanisms to elucidate its association with COVID-19. Due to undetected SARS CoV-2 contracted patients, dental practice globally has been confined to emergency treatments to curtail the spread of this pandemic. A complete triage questionnaire for documenting contact with confirmed patients, analyzing cluster

outbreaks, identifying possible infectious places, epidemiological inquiry and frequent monitoring among front-line medical personnel and epidemic prevention and control professionals is required due to the rising number of asymptomatic carriers [5].

SARS CoV-2 is transmitted by the feces-oral route. On oral entry, the pathogen invade the basement membrane cells, transferred *via* bloodstream further infecting immune system cells. Apart from the lungs, nasopharynx, gastrointestinal system, and kidney, the virus is found to have a strong affinity for Angiotensin Converting Enzyme 2 (ACE 2) receptors present on oral epithelial cells, salivary glands, tongue, buccal mucosa, and gingiva, suggesting that gingival crevicular fluid and saliva could be a possible reservoir for SARS CoV-2 spread and replication [6].

Sabrina CG, et al. found that SARS CoV-2 persists in the dental biofilm of symptomatic patients and that the oral cavity serves as a potential reservoir for SARS-CoV-2. They concluded that infected patients with poor oral hygiene could operate as potential asymptomatic carriers who can spread the illness by direct oral contact or respiratory droplets [7].

Periodontitis, a chronic inflammatory condition caused by a dental biofilm that affects the tooth's supporting tissues, is produced by an oral dysbiotic community in which pathogens such as *Porphyromonas gingivalis*, *Prevotella intermedia*, and *Aggregatibacter actinomycetemcomitans* replace good bacteria. Delaying bacterial elimination cause deepening of periodontal pockets, creating an environment favorable for viral replication. Viruses such as Epstein Bar virus-1, Herpes Simplex Virus, and Cytomegalovirus have been found in the periodontal pockets of individuals with periodontal disease in previous evidence-based studies [8]. There forth it is always worth investigating on the existence of SARS CoV-2 virus in the

dental biofilm of patients who have retracted from COVID infection.

In a case-control research conducted by Nadya M et al., it was found that COVID-19 infected patients with periodontitis have a greater risk of ICU admission, need for assisted ventilation, and death. These patients had a higher white blood cell count and blood level biomarkers like D-dimer and C-reactive protein, indicating an increased inflammatory response [9]. To link the cause-effect of these relationships, more substantive research on biological plausibility are needed. In this pandemic condition, personal periodontal health maintenance at frequent intervals is critical for patients who are currently COVID immune or have recovered from the infection [10]. Strict periodontal maintenance reduces dental plaque, potentially slowing disease progression and lowering SARS nosocomial dissemination.

Supportive periodontal therapy includes routine checkups, dental hygiene reinforcement, and rescheduling of recall appointment between 1-6 months, depending on the severity of periodontal disease, presence of local predisposing factors and systemic comorbidities. Oral prophylaxis serve to disrupt the biofilm from the tooth surface and areas inaccessible by routine oral hygiene areas like deep periodontal pocket, and interdental areas. But Dentists need to strictly adhere to the infection control protocol as per the CDC guidelines for patient management and take utmost care when using power driven instruments as dental aerosol is considered as a potential cross- contaminant [11].

Teledentistry has evolved to the point where it can be used for patient's oral hygiene implementation and motivation at regular recall intervals. This may help to reduce viral burden in various oral niches and reduce close contact with asymptomatic carriers, whose dental biofilm can still harbor the virus while being COVID immune. The patient by means of effective mechanical plaque control can perform supportive periodontal therapy by using appropriate toothbrushes and interdental cleaning aids like dental floss, toothpicks and interdental brushes. Dentist can focus on virtually educating the patients on importance of proper brushing techniques and on usage of Supra and subgingival irrigators with mouthwashes or water. Efficacy of the local and systemic antimicrobials and regular home oral hygiene regime are proven more effective in reducing the viral load after the disruption of the dental biofilm [12].

Chuan Xu's investigated on antiviral strategies like disrupting the viral envelope and nucleic acid, modifying viral glycoprotein structure, changing glycoprotein charges to diminish viral attachment to cell surface glycosaminoglycans and preventing the binding of SARS-CoV-2 spike proteins to ACE 2 receptors. Further *in vivo* studies should be emphasized on targeting the antiviral and cytotoxic activity of reagents like Povidone-Iodine (PVP-I), chlorhexidine, hydrogen peroxide, cyclodextrin, Citrox, Cetylpyridinium Chloride (CPC) and essential oils on the outer lipid membrane of SARS-CoV-2 [13].

Critical review by Carrouel F et al. highlighted the effectiveness of mouth rinses containing CPC and PVP-I in reducing the severity of COVID-19 by decreasing the SARS-CoV-2 oral load. Therefore, pre-procedural rinsing with PVP-I, hydrogen peroxide and CPC can decrease the virus expelled by the carrier, reducing the risk of contamination [14].

Caruso et al recommended that use hydrogen peroxide at concentrations of 3% and 1.5% by oral and nasal washing from the onset of the first symptoms of COVID-19 and during the illness or by hospitalized patients can decrease the viral load. This may prove beneficial for patients at high risk including elderly, immune-deficient patients, oncological patients and those with significant comorbidities [15].

Supportive periodontal therapy has been regarded as a cornerstone of successful periodontal therapy in lowering viral load in the oral cavity and, as a result, can halt the global spread of COVID 19 infection. Despite some promising research demonstrating antiviral activity, adequate *in vivo* clinical trials are required to determine the efficacy and safety of local antiviral medications before they are used in routine oral health care.

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