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## Letter to the Editor



## Photodynamic therapy as a potential oral disinfection protocol during COVID-19 outbreak

Dear Editor-in-Chief,

The 2019 Coronavirus disease (COVID-19), caused by SARS-CoV-2 virus, has spread rapidly throughout the world [1]. COVID-19 spreads mainly through airborne transmission and contact with contaminated surfaces [1]. However, more recent studies have reported the widespread presence of SARS-CoV-2 in saliva [2], which has drawn attention to transmission by this route [2]. Furthermore, studies have also shown that oral mucosa cells, as well as the salivary glands, in addition to being targets of infection, can act as reservoirs for the virus [3]. Thus, Dentistry is among the professions with the highest risk of contagion, considering the ways in which the virus spreads, the distance between dentists and patients' mouths, contact with saliva and the formation of aerosols during dental care [4].

In order to reduce and control spread in dental offices and make procedures safer, some measures have been adopted to decrease the viral load of SARS-CoV-2 in the oral cavity and oropharyngeal region [5, 6]. Among these measures, we highlight the rubber dam isolation. This traditional technique is now essential for minimizing the contact between the operator and the patients' oral fluids and maintaining the aseptic protocol [7]. Moreover, it is important to mention the use of mouthwash with antimicrobial solutions such as the chlorhexidine gluconate (CLX) solution prior to rubber dam isolation [8]. CLX is a widely used antiseptic in Dentistry because it is highly effective against several microorganisms, and significantly decreases the microbial load in the oral cavity [9]. However, its routine use as an antiseptic solution can cause changes in sensation of taste and stains on teeth and tongue [9]. Furthermore, its effectiveness in SARS-CoV-2 viral load reduction is still a matter of debate given that scientific evidence is limited.

When dealing with alternative disinfection methods, Antimicrobial Photodynamic Therapy (aPDT) has been shown to be effective against enveloped viruses [10,11], as well as in the treatment of pneumonia and/or respiratory tract infections, and the disinfection of the oral cavity [12–14]. In this sense, aPDT can also be an effective method against SARS-CoV-2, because in addition to promoting damage to the virus by the generation of reactive oxygen species (ROS) [10,11,15], it prevents the penetration of microorganisms in the mucous membranes, thereby controlling the occurrence of secondary infections [14]. aPDT becomes even more advantageous considering the SARS-CoV-2 mutation capacity, as aPDT is a method that does not trigger microbial resistance mechanisms [14,16,17]. Thus, it could serve as an alternative to oral cavity disinfection.

Some researchers suggested a protocol using aPDT, with the objective of disinfecting the oral cavity, that consists of rinsing with a mouthwash with 20 mL of curcumin photosensitizer solution [13]. After, the solution is expelled and a blue light (LED - 455 ± 30 nm) is used to activate the photosensitizer for a period of 5 min [13]. This protocol proved to be effective in reducing salivary microorganisms,

promoting general disinfection of the oral cavity (mucosa, tongue and saliva) for a period of 2 h [13]. As the risk of COVID-19 spreading in dental care is very high, it is fundamental to emphasize the importance of improving and complementing the oral disinfection procedures, especially since many infected patients present as asymptomatic condition. Previous studies confirm the effectiveness of aPDT for microbiological oral disinfection [13], and *in vitro* antiviral activity against SARS-CoV-2 [10,11]. As result, an oral disinfection protocol using mouthwashes containing a specific photosensitizer activated by a precise wavelength could be performed to reduce the spread of COVID-19 in dental offices.

In summary, aPDT associated with other safety protocols, such as the use of absolute isolation, could be applied as an alternative oral cavity disinfection method, preventing COVID-19 infection in dental care. However, it is extremely important to emphasize that pre-clinical and clinical studies are required to examine early feasibility, safety, and efficacy of this approach.

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#### Declaration of Competing Interest

The authors declare no conflicts of interest.

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