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LETTER TO THE EDITOR

Reducing Aerosol, Reducing Infection: A Perspective Analysis of the Pandemic Legacy for Oral Medicine

Reducción de Aerosoles, Reducción de Infecciones: Un Análisis de Perspectiva del Legado Pandémico para la Medicina Oral

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To the editor,

Despite vaccination advance in several countries, dental professionals remain as one of the main risk groups for COVID-19 due to close contact with patients (Clementini *et al*., 2022). As we know, SARS-CoV-2 may be transmitted either directly through saliva, blood, and other body fluids; or indirectly, through contact of hands with oral, nasal, and eye mucous membranes. With this in mind, we summarize in this letter some key topics for understanding the importance of biosafety measures during the pandemic as well as future perspectives and impact on daily activities in dentistry.

The oral environment is a source of great microbiological diversity. During dental practice, both patients and dentists are exposed to an infective risk, which derives especially from microorganisms in aerosols generated by rotatory devices as a result of water irrigation for cooling of the dental or surgical site (Zemouri *et al*., 2020). In this context and, considering the presence of body fluids and aerosol production in dental procedures, these particles may contain the novel coronavirus and disperse rapidly through the environment causing a risk of cross-contamination (Noordien *et al*., 2021). Clinically, aerosol production has been a source of debate in dentistry for decades, however, with COVID-19, this question became more prominent. The pandemic scenario required quick adaptation of all dentists, whether at the outpatient context or hospital level, to avoid the risk of contamination and propagation of this novel virus.

Although no evidence shows that aerosols generated from dental care led to the transmission of SARS-CoV-2 infection, control and personal protection measures have been recommended to mitigate aerosols spread that may contain the virus (Ionescu *et al*., 2021). In addition, several studies have reported the presence of the virus in different oral tissues both in vivo and in post mortem patients. The main intraoral areas include tongue cells, gingiva, and salivary glands, the latter being a potential reservoir to pathogen incubation and replication (Matuck *et al*., 2020, 2021; Marquès & Domingo, 2021), which justifies its high concentration in the salivary fluid.

For instance, it has been strongly recommended the use of chlorhexidine as mouthwash to reduce SARS-CoV-2 load (Clementini *et al*.). Although it is a traditional antimicrobial agent, and preferably used to control dental biofilm, Costa *et al*. (2021) through a randomized clinical trial demonstrated that chlorhexidine gluconate

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in its conventional concentration (0.12 %) reduced theload of SARS-CoV-2 in 72 % of the volunteers in the study. This finding has substantial value once it attests to the safety of traditional mouthwashes, especially in a moment in which the emergence of Variants of Interests (VOI) such as P.1 (B.1.1.28.1), delta (B.1.617.2), mu (B.1.621), and Omicron (B.1.1.529) are discussed. Moreover, according to Ionescu *et al*. the addition of 0.5 % H_2O_2 to the water spray of dental handpieces reduced the possibility of SARS-CoV-2 spread during dental procedures.

Despite the enthusiasm of preliminary studies, dental aerosol reduction remains a real challenge in clinical practice, mainly by the number of medium to high complexity procedures performed daily, involving restorations, invasive oral surgeries, and cosmetic rehabilitation. In general, the refrigeration generated by the water stream is essential to prevent tissue overheating and posterior necrosis. Clinical trials have shown effective alternatives to control SARS-CoV-2 in the dental environment. Among these, Noordien *et al*. demonstrated that an extra-oral dental aerosol suction device presents a cost-effective option to reduce aerosol, droplets, and splatter (Fig. 1), while Teichert-Filho *et al*. (2020) suggest acrylic chambers as a viable alternative of use and low-cost device. Particularly, in our daily activities, we adopt as an artifice, the disconnection of the dental unit waterlines from the high-speed instruments and, manual irrigation with a water syringe is performed instead. It is worth noting that these preventive measures are not exclusive to SARS-CoV-2 and other viral agents may also be transmissible through aerosol particles. On the other hand, epidemiological analyses point to the possibility of the novel coronavirus becoming endemic regardless of vaccination (Torjesen, 2021), which would make such biosafety measures mandatory to the dental environment.

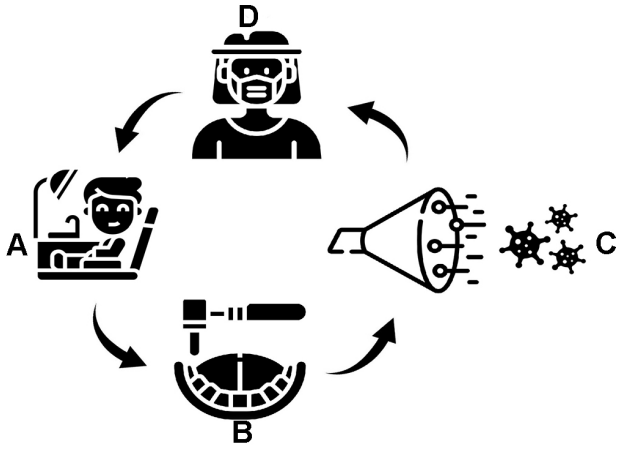

Fig. 1. Illustrative representation of a routine dental care, involving aerosol generation and device to contain its propagation. (a) – Patient. (b) – Aerosol´s production during dental assistance. (c) - Aerosol suction. (d) - Equipped professional.

Besides, complex crosstalk exists between commensal microbes and the host, which is essential for the functioning of the immune system. Since viruses can alter the oral microbiota, favoring dysbiosis and disease progression, recent studies have confirmed that SARS-CoV-2 infection may impact the structure of the microbiome, stimulating dysbiosis, which would be associated with disease progression and severity in COVID-19 patients, including oral lesions (Soffritti *et al*., 2021). Zarpellon *et al*. (2021) in their Post-mortem study did not identify any association between critical cases of the disease that progressed to death with the presence of virus in tissues, suggesting the modulatory role of SARS-CoV-2 in the oral microenvironment. Therefore, this finding itself reinforces the adoption of biosafety protocols, to protect both patient and dental staff, and dental staff should consider more than one strategy or device to minimize the risk of infection and control aerosol in the dental office environment.

In conclusion, we reinforce the need for special attention of oral medicine professionals during this pandemic phase and, regardless of the vaccination stage, all sanitary measures should be fulfilled, to avoid an increased risk of cross-contamination and, consequently, the emergence of more infective strains.

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