PREPROCEDURAL MOUTH RINSES AND COVID-19 TRANSMISSION: THE ROLE OF CHLORHEXIDINE

The global pandemic due to the SARS-CoV-2 virus, responsible for a disease called Covid-19 (Corona Virus Disease, first detected in 2019 in Wuhan, China), has led to numerous changes and restrictions that affect people’s daily lives but also many professional activities.

Many recommendations and behavioural guidelines have been published in different countries by professional dental chambers and dental associations1-6 to deal with this critical situation.

Covid-19 represents an infection of much more real concern to dentistry than to any other profession.

In the report of the US Bureau of Labour Statistics, also covered intuitively and interactively by a publication in the New York Times7, it is mentioned that dentistry presents the greatest risk of exposure of medical practitioners to an infection, as they are brought in much closer contact with patients and patients' saliva.

Great concern derives from the contaminated aerosol that dental procedures can generate. Wölfel and colleagues8 performed a virologic assessment of hospitalized patients with a mild form of covid-19 in Germany. Their analysis clearly show that pharyngeal virus shedding was very high during the first week of symptoms and the RNA peak concentration were 1000 times higher comparing to SARS concentration studies. It is therefore essential to understand if and how the new virus responsible for the Covid-19 pathology can be present in the dental aerosol, and to what extent it can persist in the environment and on surfaces. Van Doremalen et al9 described the survival of the virus both in the aerosol and on the surfaces on which the virus can settle. The few studies in the field of dentistry on the Covid-19 pathology10-15, up to March 2020, provide recommendations for ensuring the safety and protection of the operator. The high risk of transmission of the virus and the exponential increase in positive cases, in addition to the known possibility of being an asymptomatic or paucisymptomatic carrier, obliges dental practice staff at a time of global pandemic to consider all patients as potentially infected.

Of the various recommendations, one would appear to be of significant interest to the dental practitioner: the use of a mouthrinse as a possible safeguard to prevent cross infections, reduce aerosol contamination and inactivate the virus in the oral cavity.

Only four papers10-13 so far provide, mostly uneven and conflicting, recommendations for a preprocedural mouth rinse to reduce the polymicrobial load present in patients’ saliva suggesting, according to the papers: povidone-iodine 1%, hydrogen peroxide 1%, chlorhexidine, cetylpyridinium chloride (CPC) 0.1% and essential oils.

One study in particular (Peng et al11) suggests the use of preprocedural mouthrinses with an oxidative mechanism, such as hydrogen peroxide 1% or povidone-iodine 1%, since these have proven effective against other Coronaviridae family viruses and to avoid chlorhexidine because apparently less effective, even if not tested directly against SARS-CoV-216-17.
In contrast to this suggestion, chlorhexidine has a well-documented activity against viruses in general and specifically against enveloped viruses (HIV).

Moreover, the review by Lim and Kam shows that chlorhexidine has an excellent virucidal action, even against coronaviruses, at even lower concentrations than those tested in the two previously cited studies.

Recently, in one of the first study performed on SARS-CoV-2, Chin and collaborators demonstrated, in a laboratory test, the virucidal efficacy of chlorhexidine at standard working concentration in a surface disinfectant formulation. They concluded that SARS-CoV-2 can be highly stable in a favourable environment, but it is also susceptible to standard disinfection methods like chlorhexidine and other commonly used disinfectants.

Considering the available literature, all the antiseptics proposed so far have an antiviral effect and it is therefore impossible to say that any one of them is not active against viruses. In the specific case of the SARS-CoV-2 virus, however, there is no definite evidence so far that any of them has an inactivating or antiviral action if used as a mouthrinse. Only deductions can be made based on the action mechanism, on the data relating to similar viruses in the past, on results obtained in vitro or in other non-dental fields, and on actions on inanimate surfaces in the field of disinfection.

Concluding:
- There is no definite proof that hydrogen peroxide 1% and povidone-iodine 1% are effective when used as mouth rinses against the SARS-CoV-2 virus, but their underlying oxidation mechanism can inactivate numerous Coronoviridae viruses from contaminated surfaces and areas.
- Chlorhexidine has certainly been proven to reduce the presence of microorganisms in the aerosol produced by dental procedures and has the highest substantivity and efficacy as a chemical plaque control agent.

These considerations suggest, as some guidelines have proposed, a double rinse with an oxidative agent followed by a broad-spectrum antiseptic. Since povidone-iodine 1% (an oxidative agent) has some contraindications (in the case of pregnancy, kidney failure, thyroid disease or concomitant drug therapies) and can be inactivated by other concomitant oral disinfectant, the most appropriate rinse procedure seems to: gargle with 1% hydrogen peroxide mouthwash for at least 15 seconds with a final rinse of 30 seconds. Followed by a rinse with 0.20% chlorhexidine mouthrinse for at least 60 seconds and then gargle for at least 15 seconds.

It is important to respect the duration of the rinses and especially the order given above to obtain the properties given by each antiseptic. It should also be highlighted that it is not, however, appropriate to combine the two products in a single rinse because, although chlorhexidine and hydrogen peroxide can coexist, no studies have still assessed a self-made mixture against SARS-CoV-2 virus or the possible reduction of their activity in such a mix.
Bibliography