



# Major considerations of dental care in COVID-19: an evidence-based on clinical studies and guidelines

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## Abstract

**Introduction:** The COVID-19 pandemic has presented enormous challenges for dentists and patients. The risk of nosocomial transmission is a reality that requires the development of guidelines by the dental community to reduce the chances of infection by the new coronavirus. In this sense, it was necessary to implement alternative prophylactic techniques such as the adoption of oral rinses before dental care. **Objective:** To present the main considerations of clinical studies on dental care at COVID-19. **Methods:** The research was carried out from May 2021 to June 2021 and developed based on Scopus, PubMed, Science Direct, Scielo, and Google Scholar, following the Systematic Review-PRISMA rules. The quality of the studies was based on the GRADE instrument and the risk of bias was analyzed according to the Cochrane instrument. **Results:** One study showed that 0.2% chlorhexidine and 1% povidone-iodine oral solutions are effective pre-procedural mouthwashes against salivary SARS-CoV-2 in dental treatments. It was observed in another study that the effect of reducing the salivary load with mouthwash with CPC and PI was maintained after 6 hours. PVP-I nasal and oral antiseptic solutions are effective in inactivating SARS-CoV-2 at a range of concentrations after exposure times of 60 seconds. There is sufficient in vitro evidence to support the use of antiseptics to potentially reduce the viral load of SARS-CoV-2. The effects against the new coronavirus in vivo still need more randomized clinical trials to prove its effectiveness. **Conclusion:** ACE2 receptors are highly expressed in the oral cavity, therefore, this could be a potential high-risk route for SARS-CoV-2 infection. The virus can be detected in saliva even before the

appearance of symptoms of COVID-19. In this regard, randomized clinical studies have shown that some pre-procedure oral mouthwashes are effective against salivary SARS-CoV-2 in dental treatments. In addition, the American Academy of Implant Dentistry (AAID) reported on how COVID-19 impacts dental care through guidelines for general dentistry.

**Keywords:** Dentistry. Dental care. Mouthwashes. Prophylaxis. Pandemic. COVID-19. Guidelines.

## Introduction

The COVID-19 pandemic has presented enormous challenges for dentists and patients [1]. The risk of nosocomial transmission is a reality that requires the development of guidelines by the dental community to reduce the chances of infection by the new coronavirus. Thus, credible recommendations are needed and research gaps could be filled by soliciting the opinion of international frontline experts [2].

In this context, the transmission risk for non-aerosol procedures in dental offices was considered low or neutral by approximately 55% of specialists, while for aerosol-generating procedures, the vast majority (93%) agreed that the risk was high [2]. Despite this, the current pandemic is an opportunity for constructive change, to improve hygiene techniques and more patient-centered care [3]. It is the right time to redefine and rethink the role of healthcare professionals. The "3R" principle, (R)edefinition, (R)econsideration, and (R)eflections, addresses these challenges well in the dental sector [4].

In this aspect, dental care is a crucial element in the entire health system [5]. In this context, clinical



studies have evaluated the efficacy of pre-dental oral rinses in reducing the viral load of salivary SARS-CoV-2 [6,7]. Even though relevant key expressions such as screening, prioritization, commitment, and difficult decision-making have become a daily reality in this time of the pandemic, these actions can bring "added value" and improve our service, especially with teleconsultations. Also, because the impact of COVID-19 on well-being and mental health appears to be significant, dental services will need to be able to provide psychological counseling [8,9-12].

In this sense, it was necessary to implement alternative techniques for the treatment of phobic patients or patients with behavioral disorders, such as gradual exposure, hypnotherapy, behavioral management, professional cognitive-behavioral therapy (CBT), the use of virtual glasses for distraction, desensitization methods, etc. [13-15]. Thus, the recently implemented strict cross-infection control measures and awareness of the transmission of infectious diseases have positively influenced the management of dental services.

In this scenario, the overall impact of SARS-CoV-2 on general health is considered to be much more profound, with significant effects across multiple systems and functions [16-20]. Thus, after the pandemic, dental teams must be well prepared to deal with the increasing number of patients with unresolved medical and dental problems or unfinished courses of treatment [21].

Therefore, the present study presented the main considerations of clinical studies on dental care at COVID-19.

## Methods

### Study Design

This was followed by a systematic literature review model, according to the PRISMA rules [22].

### Data sources and research strategy

The search strategies for this review were based on the descriptors: "Dentistry. Dental care. Mouthwashes. Prophylaxis. Pandemic. COVID-19. Guidelines". The research was carried out from June 2021 to October 2021 and developed based on Google Scholar, Scopus, PubMed, Scielo, and Cochrane Library. Also, a combination of the keywords with the Booleans "OR", "AND", and the operator "NOT" were used to target the scientific articles of interest.

### Study quality and risk of bias

The quality of the studies was based on the GRADE

instrument [23], with guidelines, randomized controlled clinical studies, prospective controlled clinical studies, and studies of systematic review and meta-analysis listed as the studies with the greatest scientific evidence. The risk of bias was analyzed according to the Cochrane instrument [24].

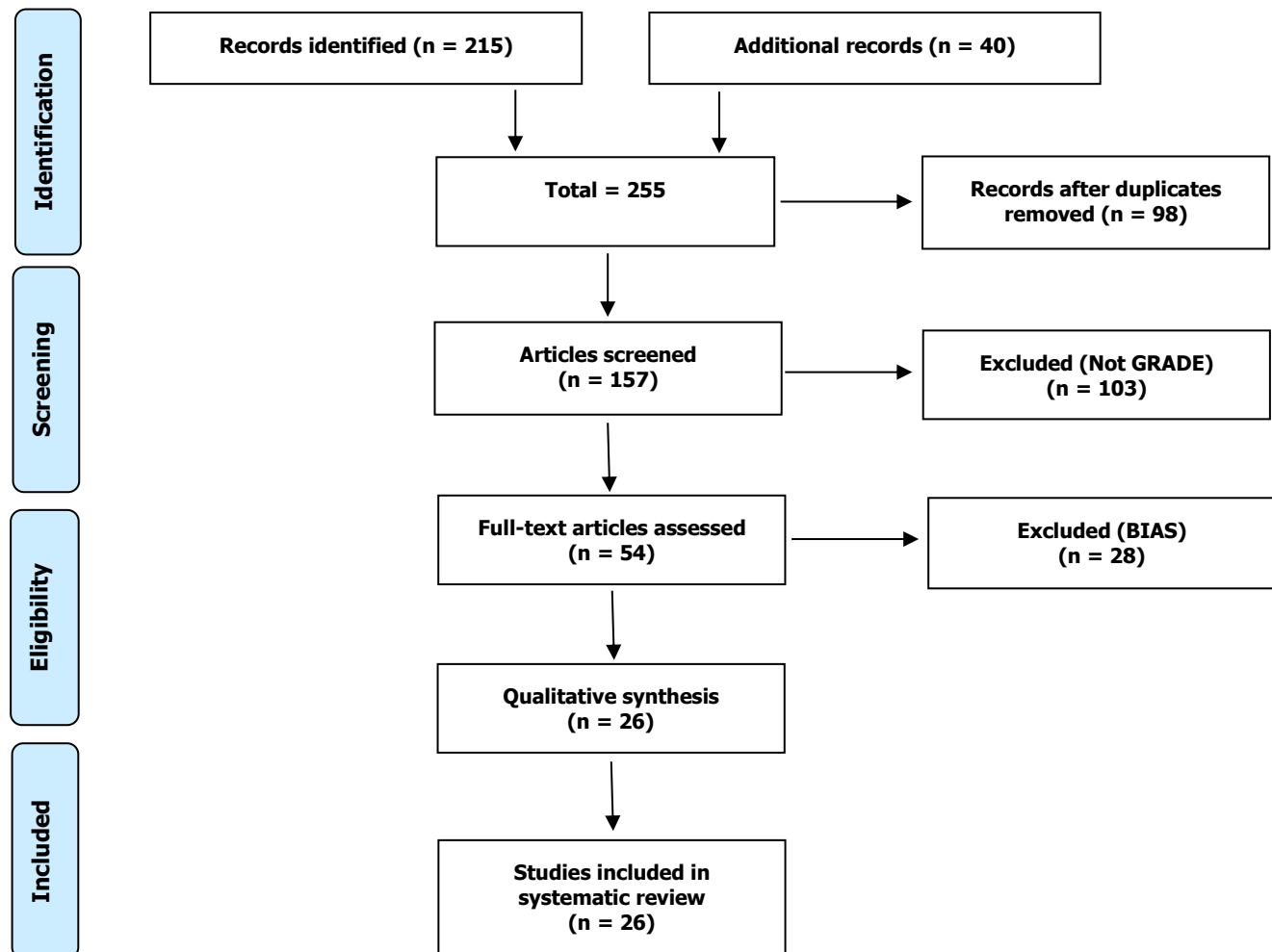
## Results and Discussion

After the selectivity of articles and literary findings, 255 studies were analyzed, with only 26 medium and high-quality studies selected, according to GRADE rules, and with risks of bias that do not compromise scientific development, based on the Cochrane instrument (**Figure 1**). After analyzing the major clinical studies on the safety of dental procedures in the COVID-19 pandemic, it was observed that many state or local governments classified dental treatments as not essential to preventing infections as much as possible. Dentists were instructed to only perform procedures designated as emergencies. In this sense, dentistry has been advancing strongly in improving oral health through the prevention of dental emergencies [25,26].

In this regard, a randomized controlled clinical trial evaluated the efficacy of 2 pre-procedure types of mouthwash in reducing the viral load of salivary SARS-CoV-2 and compared the results of mouthwashes with a control group. The study group consisted of COVID-19 positive patients confirmed in the laboratory using nasopharyngeal swabs. Participants were divided into 3 groups. For 30 seconds, the control group rinsed their mouths with distilled water, another group rinsed their mouths with 0.2% Chlorhexidine, and the Povidone-iodine group gargled with 1% Povidone-iodine. Saliva samples were collected before and 5 minutes after mouth rinsing. SARS-CoV-2 RRT-PCR was then performed for each sample. Sixty-one compliant participants (36 women and 25 men) with a mean age of  $45.3 \pm 16.7$  years were enrolled. A significant difference was observed between the delta Ct of the distilled water wash and each of the 2 solutions of 0.2% Chlorhexidine and 1% Povidone-iodine. No significant difference was found between the delta Ct of patients using 0.2% chlorhexidine and 1% povidone-iodine solutions. A significant difference in the mean Ct value was found between paired samples in the Chlorhexidine group ( $n = 27$ ) and also in the Povidone-iodine group ( $n = 25$ ). In contrast, no significant difference existed before and after the experiment in the control group ( $n = 9$ ). Therefore, oral solutions of 0.2% chlorhexidine and 1% povidone-iodine are pre-procedural mouthwashes effective against salivary SARS-CoV-2 in dental treatments [6].

Yet another randomized controlled clinical trial



**Figure 1.** Flow chart.

evaluated the efficacy of three commercial oral types of mouthwash such as povidone-iodine (PI), chlorhexidine gluconate (CHX), and cetylpyridinium chloride (CPC) in reducing salivary viral load SARS-CoV-2 in patients with COVID-19 compared to water. A total of 36 SARS-CoV-2 positive patients were recruited, of which 16 patients were randomly assigned to four groups-PI groups ( $n = 4$ ), CHX group ( $n = 6$ ), CPC group ( $n = 4$ ), and water as a control group ( $n = 2$ ). Saliva samples were collected from all patients at baseline and 5 min, 3 h, and 6 h after application of mouthwashes and water. The samples were submitted to SARS-CoV-2 RT-PCR analysis. As a result, it was observed that the effect of reducing salivary load with oral rinsing with CPC and PI was maintained after 6 hours [7].

Also, a study evaluated nasal and oral antiseptic formulations of PVP-I against SARS-CoV-2. Nasal antiseptic formulations of povidone-iodine and antiseptic oral rinse formulations of PVP-I at concentrations from 1% to 5%, as well as controls, were studied. Nasal and oral antiseptic solutions of PVP-I are effective in inactivating SARS-CoV-2 at a range of concentrations after exposure times of 60 seconds [27].

In this scenario, it is noteworthy that ACE2 receptors are highly expressed in the oral cavity, therefore, this may be a potentially high-risk route for SARS-CoV-2 infection. In addition, the virus can be detected in saliva even before the appearance of symptoms of COVID-19, with the consequent risk of virus transmission. Lowering the oral viral load may lead to a lower risk of transmission through salivary droplets or aerosols. Thus, a review study evaluated the available evidence testing the in vitro and in vivo effects of oral antiseptics to inactivate or eradicate coronaviruses. It is sufficient in vitro evidence to support the use of antiseptics to potentially reduce the viral load of SARS-CoV-2. The effects against the new coronavirus in vivo still need more randomized clinical trials to prove its efficacy [28].

In this regard, the American Academy of Implant Dentistry (AAID) reported how COVID-19 impacts dental care through guidelines for dentistry in general. Thus, **Table 1** below highlights the main issues [29].

Besides, European guidelines and expert opinion have shown the control and prevention of infections in dentistry during the pandemic. The dynamics of the



pandemic had an impact on rapidly published and frequently updated national guidelines in Europe. As the guidelines were not based on solid evidence, they were supplemented by expert opinion on the control and prevention of infections in dentistry. Dental care should be guaranteed during the pandemic, but in case of suspected or confirmed COVID-19 disease, treatment should be delayed if possible [25].

**Table 1.** Issues about dental care in the COVID-19 pandemic [29].

✓ What constitutes a dental implant-related emergency?
✓ How should patients be screened and screened?
✓ What personal protective equipment is needed?
✓ How should operators be equipped?
✓ What equipment should be used?
✓ What, when, and how can procedures be performed?

In addition, remote screening and patient-related measures have been recommended as the most effective in reducing SARS-CoV-2 transmission. The type of personal protective equipment provided by the dental team must be appropriate to the procedure and the risk of infection. It is important to continually update dental guidelines, considering the evolution of the pandemic and the new scientific evidence available [3].

Thus, a study assessed the opinion of European experts on the control and prevention of infections in dentistry during the second wave of the pandemic. A total of 26 experts participated in the survey. The overall risk of transmission in dental settings was scored lower compared to the initial survey, although the risk associated with aerosol-generating procedures (AGP) was still high. The use of PPE was less frequently recommended for non-AGP, while most experts still recommended FFP2 / FFP3 masks (80.8%), face shields or goggles (88.5%), lab coats (61.5 %), and caps (57.7%) for AGP. Most specialists also considered the mouthwash to be relevant (73.1%) and reported using it before treatment (76.9%). No uniform opinion was found regarding the relevance of the COVID-19 test for staff and patients [25].

Also, a study gathered experiences and recommendations from frontline clinical experts on critical aspects of providing dental care during the pandemic. The risk of SARS-CoV-2 transmission in dental settings for aerosol-generating procedures was considered high. For non-aerosol procedures and

aerosol generators, more than 80% of experts recommended face shields and caps for each treatment. For aerosol generation procedures, additional measures (FFP2/FFP3 masks and aprons) were suggested by the vast majority of experts. Therefore, limiting aerosol generation procedures along with the use of adequate personal protective equipment was considered crucial to protect oral health professionals and patients [3].

## Conclusion

ACE2 receptors are highly expressed in the oral cavity, therefore, this may be a potential high-risk route for SARS-CoV-2 infection. The virus can be detected in saliva even before the appearance of symptoms of COVID-19. In this regard, randomized clinical studies have shown that some pre-procedure oral mouthwashes are effective against salivary SARS-CoV-2 in dental treatments. In addition, the American Academy of Implant Dentistry (AAID) reported on how COVID-19 impacts dental care through guidelines for general dentistry.

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## Data sharing statement

No additional data are available.

## Conflict of interest

The authors declare no conflict of interest.

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