



Review Article

The Significance of Coronavirus Disease 2019 in Dentistry: A Scoping Review



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Running Title Significance of COVID-19 in Dentistry

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ABSTRACT

Background: The emergence of coronavirus disease 2019 (COVID-19) pandemic had a significant impact on dental profession, and COVID-19 prevention and control have been the topic of numerous investigations.

Objectives: This study aimed to review the most effective strategies for prevention and control of COVID-19 before, during, and after dental procedures in the pandemic and post-pandemic era.

Materials & Methods: This scoping review was conducted according to the five stages of conduct proposed by Arksey and O'Malley. The latest findings available in most accredited databases and scientific websites including Science Direct, Scopus, PubMed, and Google Scholar, and the guidelines recommended by the World Health Organization and Center for Disease Control and Prevention were searched using the following MeSH terms: "COVID-19", "Dentistry", "Infection Control", and "SARS-CoV-2". Irrelevant articles, duplicates, and those not meeting the eligibility criteria were excluded. The remaining 24 eligible articles were reviewed.

Results: After data analysis, an efficient protocol for dental procedures during the COVID-19 pandemic was tabulated, which included emergency treatments only, preoperative rinsing of an effective mouthwash, patient triage, principles of personal protection for patients and the staff, aerosol elimination from the office, efficient disinfection of the environment, and specific measures for different dental procedures.

Conclusion: Dental clinicians can play a pivotal role in prevention of COVID-19 transmission by precise adherence to the protocols, updating their knowledge, and educating patients prior to their visit. Accordingly, they can fulfill their professional responsibility in treatment of emergency cases and other patients. Despite the ongoing global vaccinations against the COVID-19, genetic mutations that occur in the viral genome over time can still challenge the future of dental profession.

Keywords: COVID-19, Dentistry, Infection control, SARS-CoV-2

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1. Introduction

The first case of a specific type of pneumonia with an unknown cause was detected and reported in December 2019 in Wuhan city of Hubei Province in China. The cause was identified to be the Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2), and the disease was named Coronavirus Disease 2019 (COVID-19) [1, 2]. Soon after, the World Health Organization (WHO) announced the COVID-19 pandemic situation [3, 4]. COVID-19 can affect people of all ages. However, old age, and presence of underlying systemic conditions such as hypertension, diabetes mellitus, and cardiovascular and respiratory diseases are significantly associated with a poorer prognosis and higher rates of morbidity and mortality [5]. The most important feasible strategy and practical approach to confront the disease transmission was found to be vaccination to induce immunity prior to affliction with the disease. Thus, the pharmaceutical companies worldwide put all their efforts to develop COVID-19 vaccine. However, the COVID-19 viral genome undergoes continuous mutations, and each new variant can target a new age group, shifting from the elderly to children. Also, the spreading ability and infectivity of the virus, and the associated morbidity and mortality rates can change with each mutation. People that are against vaccination can cause new disease peaks in different communities [6, 7].

The healthcare workers are at higher risk of COVID-19 infection. Dental clinicians are in close contact with patients in the process of conduction of dental procedures, and are exposed to the generated aerosols and saliva droplets. Thus, they are at high risk of infection with COVID-19 pandemic. The risk is also high for dental patients and the staff [8, 9].

To date, adherence to protective and preventive measures has been the most important strategies to confront COVID-19 [8, 10]. Since dentists are at high risk of COVID-19 infection and transmission, they are expected to have adequate knowledge about its routes of transmission, protection principles, and preventive strategies. This study aimed to conduct a scoping review on infection control in dentistry during the COVID-19 era. The main objective of this study was to find the most effective strategies for dental clinicians, the staff, and patients for prevention and control of COVID-19 before, during, and after dental procedures.

2. Materials and Methods

This scoping review focuses on infection control, routes of transmission, and prevention of COVID-19 in dental office setting. The review was carried out according to the five stages of conduct proposed by Arksey and O'Malley namely (I) specification of research goals and search strategy, (II) identifying the relevant literature, (III) study selection, (IV) data extraction, and (V) summarizing, synthesizing, analyzing, and reporting the results [11]. Table 1 presents the stages of this review in brief. The latest findings available in most accredited databases and scientific websites including Science Direct, Scopus, PubMed, and Google Scholar, and the guidelines recommended by the World Health Organization, the United States Center for Disease Control and Prevention, American Dental Association, Iranian Dental Association, and the Iranian Ministry of Health and Medical Education were searched by the titles and abstracts using the following MeSH terms: "COVID-19", "Dentistry", "Infection Control", and "SARS-CoV-2", ("SARS-CoV-2) AND ("Dentistry" OR "Dental" OR "COVID-19" OR "Corona" OR "Coronavirus" OR "COVID-19") AND ("SARS-CoV-2). A search was conducted for English articles published from 2020.01.01 to 2022.01.01. Duplicates were removed, and irrelevant and invalid articles were excluded by reviewing the titles, abstracts, and full-texts of the articles. Comparison and assessment of the eligibility of the articles were performed by consensus among the researchers, and cases of disagreement were discussed with another researcher. Data extraction was performed independently by each researcher using predesigned forms, and the collected data were then compared and assessed in a panel of experts. The PRISMA flowchart was used to select the relevant articles according to the research question by the researchers with a teamwork approach. Table 1 presents the phases of this scoping review in detail.

3. Results

Of a total of 27,350 articles and 1200 other pieces of literature, 10,127 were deleted since they were duplicates, 18,193 were deleted due to absence of keywords, and 206 were deleted since they did not meet the study objectives. After screening, 24 eligible articles remained (Figure 1). Table 2 presents the extracted data from the articles. Of eligible articles, 13 articles only allowed emergency dental procedures during the COVID-19 pandemic, and recommended postponing other procedures [4, 8, 12-22]. However, all of them emphasized on primary triage of patients prior to their admission, per-

Table 1. Phases of the scoping review in detail

Steps	Details
Specifying the research question	<p>Clarification and linking the research objective to research question:</p> <ul style="list-style-type: none"> -Employing the most effective strategies for COVID-19 prevention and control before, during and after dental procedures
Identifying the relevant literature	<p>Searching the literature to reach an equilibrium among the feasibility, extent, and comprehensiveness of the topics:</p> <ul style="list-style-type: none"> -Searching the English and Persian databases including Scopus, PubMed, ISI, World Health Organization, American Dental Association, Iranian Dental Association, and the Iranian Ministry of Health and Medical Education -Using MeSH terms including "COVID-19", "Dentistry", "Infection Control", and "SARS-CoV-2", ("SARS-CoV-2) AND ("Dentistry" OR "Dental" OR "COVID-19" OR "Corona" OR "Coronavirus" OR "COVID-19") AND ("SARS-CoV-2) -Publication dates between 2020.01.01 and 2022.01.01
Selection of studies	<p>Precise article selection by a teamwork approach:</p> <ul style="list-style-type: none"> -The collected literature was in accordance with the research objectives, and included dental strategies and guidelines for the pandemic and post-pandemic era -Articles relevant to the research topic were selected. -Eligibility assessment was done by consensus among all researchers. -PRISMA flowchart was used.
Data synthesis	<p>Data extraction:</p> <ul style="list-style-type: none"> -Intervention: Knowledge about, and implementation of therapeutic and preventive measures in dental procedures -Comparison: Studies were compared by consensus among the researchers.
Reporting the results	<p>Identifying the outcomes for strategy planning, implementation, or research:</p> <ul style="list-style-type: none"> Data presentation by tabulation or text



sonal protective measures, optimal environmental safety measures, and use of equipment to control contaminants and aerosols. Fourteen articles suggested mouthwash rinse prior to dental procedures to decrease the viral load [4, 8, 12, 13, 16, 18-20, 22-27]. Final recommendations are presented in Table 2.

4. Discussion

This study was designed aiming to empower the dental clinicians in provision of clinical dental services during the COVID-19 pandemic by their knowledge enhancement. The topics discussed in this review can help to resume dental profession during the pandemic and even after global vaccination and overcoming the COVID-19 pandemic. In this study, management of patients was discussed in three categories of prior to entering the office, in the office, and after leaving the office.

Prior to entering the office

Since prevention of infection transmission is the most important factor to consider in COVID-19 pandemic, primary triage of patients over the phone prior to treatment is among the main responsibilities of the staff [12, 18]. It is recommended to postpone dental procedures for a minimum of 30 days after COVID-19 infection. Also, all emergency dental procedures should be performed by complete adherence to the protective protocols [10, 20, 22]. The prioritized emergency treatments include pain control, management of jaw fractures with a risk of air-

way obstruction, bacterial infections of oral soft tissue with a risk of airway obstruction or involving the eyes, and uncontrolled postoperative bleeding. In such cases, patients should be referred to professional centers. For forensic purposes, all patient responses during over-the-phone and in-person triage should be recorded and verified by patients [4, 8, 9]. Patients should also receive the required instructions regarding adherence to office protocols such as wearing a mask, bringing their own pen, paying with debit card instead of cash, and not having any companions [10, 12, 15].

In the office

All patients should wear an appropriate mask when entering the office. Patients are required to step into a tray containing sodium hypochlorite (800 mL water plus 200 mL of sodium hypochlorite with 10,000 ppm, which should be replaced every 4 hours) or must wear disposable shoe covers. These instructions were particularly emphasized before global vaccination. Also, the patients should disinfect their hands with hand sanitizers available in the office. If the patient leaves the office for a while and then comes back, all the aforementioned steps should be repeated [24, 25]. A separate safe room should be preferably considered for active screening of patients to minimize contact between patients, the staff, and dental clinician. The medical history of patients should be reevaluated in the office as well. Also, measuring the body temperature of each patient is recommended during COVID-19 peaks. If the patient's medical history

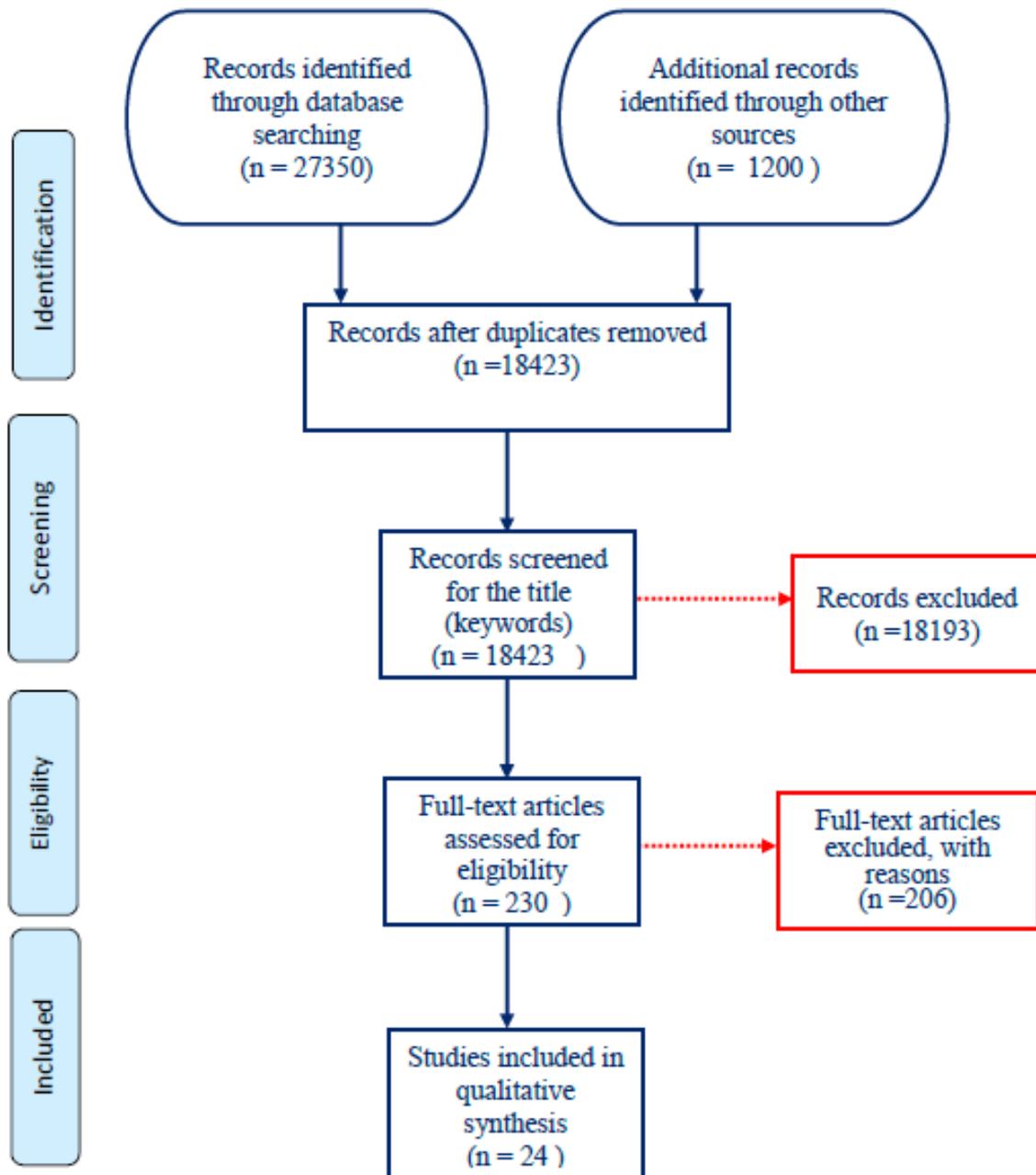


Figure 1. PRISMA flowchart of the review



suggests the possibility of infection or being a carrier, or if the patient's body temperature is higher than 37.5°C (99.5°F), the patient should lockdown himself/herself at home for a minimum of 14 days or should go to a hospital [14, 15, 20, 22, 27].

During dental procedures

Reduction of viral load: It is recommended to use an antiseptic mouthwash to minimize the viral load in the oral cavity. Literature is controversial regarding the ef-

ficacy of chlorhexidine for this purpose since it has low virucidal effect on the coronavirus. Mouthwashes have low substantivity on the oral mucosa, and the viruses present in the saliva can easily re-colonize the mucosa; 1% hydrogen peroxide is most commonly recommended for this purpose due to its optimal virucidal effect. To prepare 15 mL of 1% hydrogen peroxide, 5 mL of 3% hydrogen peroxide should be added to 10 mL of distilled water [13, 16, 18, 19, 24, 26].

Table 2. Items of infection control and recommendation for different categories of dentistry services

Category	Infection Control	Recommendation
Personnel	<ul style="list-style-type: none"> -Regular surface disinfection with effective disinfectants (62%-71% ethanol, 0.5% hydrogen peroxide, 0.1% sodium hypochlorite, isopropyl alcohol) between treatment sessions [8-10, 12-14, 17-20, 22, 24, 26, 28, 30] -All personnel should wear a surgical mask [12, 24] -Dental assistant should have a head cover, water-resistant disposable surgical gown, gloves, goggles, face shield, and disposable shoe cover [10, 13, 22, 30] -Necessary use of face masks with <50 µm pore size (N100, FFP2/N95, FFP3/N99) by dental assistant [12, 23] -Correct disposal of personal protective equipment used in each working shift [10, 13, 15, 18, 19, 25, 28] 	<ul style="list-style-type: none"> -Number of staff should be decreased to minimum [16, 21] -Primary triage of patients online or over the phone [8, 10, 12-16, 19-22, 25, 28] -Patient registration by over-the-phone triage and creating a patient record [12, 14] -Identification of chief complaint and taking a history over the phone or through a video conference [12, 21] -Postponing elective procedures [12-14, 17, 20, 22, 25] -Accurate scheduling of patients to prevent overlap [12, 19, 23, 25] -Not accepting patients without appointment [15] -Instructing the patients to follow the protocols [8, 21, 22, 25, 29] -Measuring the patients' body temperature by a thermometer [10, 21, 22, 24] -Measuring the body temperature of the staff and dentist [4, 15, 20, 25] -Self-quarantine of the assistant or receptionist in case of presence of symptoms even without a PCR test [27]
Patients	<ul style="list-style-type: none"> -Wearing a mask [12, 23, 25, 28, 29] -The patients should step into a tray containing hypochlorite solution [12, 14, 22, 24] -Wearing appropriate disposable shoe covers when stepping in [12, 14, 22, 24] -Hand washing upon entry for a minimum of 20 seconds, followed by disinfection with an alcohol-based gel containing 60%-95% alcohol [8, 12-15, 22, 24, 25, 28] -Washing hands and face prior to leaving the operatory [22, 24] -The patient companion should also wash his/her hands and face after entry and before leaving the operatory [22] -Contactless hand sanitization with automatic hand sanitizer systems equipped with a sensor [10, 12] -Avoid direct contact with others as in hand shaking [12, 14, 20, 22, 24] 	<ul style="list-style-type: none"> -Toothbrushing at least twice a day [26, 31] -Use of dental floss at least once a day [26, 31] -Use of 1% povidone iodine mouthwash 3-4 times a day [26, 31] -Waiting in the car until the appointment time [8, 12, 22, 25] -Wearing a mask in the office [8, 22, 25] -Bringing personal pen and debit card instead of cash [8, 21, 22, 25] -Patients should not be accompanied by any companion except for young children, elderly, and disabled individuals [12, 15, 25] -All patients should have a negative PCR test for COVID-19 [17] -The patients should bring their PCR test result with them, if available [10]
Dentist	<ul style="list-style-type: none"> -Hand washing with soap for a minimum of 20 seconds before and after contact with each patient [8, 9, 15, 18, 23, 26, 28, 30] -Correct use of personal protective equipment without their contamination, and their safe disposal [12] -Wearing a surgical mask, Latex gloves, face shield, and goggles for patient examination [16] -Mandatory use of masks with <50 µm pore size (N100, FFP2/N95, FFP3/N99) during dental procedures [8, 12, 16-18, 22, 23] -In case of using a mask with exhalation valve, additional coverage with a surgical mask should be considered [12]. -Hand sanitization with an alcohol-based gel (alcohol concentration over 60% or 70%) after handwashing with soap for a minimum of 20 seconds [9, 12, 22-25] -Wearing a head cover, water-resistant disposable surgical gown, gloves, goggles, face shield, and disposable shoe covers [9, 12-14, 17, 22, 23, 25, 30] 	<ul style="list-style-type: none"> - Availability for phone consultation or tele-medicine [9, 12, 21] -Comprehensive education of the staff regarding their tasks and use of personal protective equipment [10, 13]

Category	Infection Control	Recommendation
Procedure	<ul style="list-style-type: none"> -The patients should brush their teeth prior to the procedure [10] -Reduction of viral load by rinsing a mouthwash prior to the procedure [4, 8-10, 12, 13, 16, 18, 19, 22-27] such as: <ul style="list-style-type: none"> (I) 1-1.5% hydrogen peroxide (II) 1-2% povidone iodine (III) 0.05% hypochlorous acid (IV) 0.05-0.2% cetylpyridinium chloride 	<ul style="list-style-type: none"> -Prescription of analgesics and antibiotics for long-distance emergency management of patients [21, 22] -Postponing dental procedures of infected patients for at least 1 month [25] -Scheduling immunocompromised patients as the first patient [25] -Use of disposable instruments [18] -Treatments should be performed in one single session [12, 24, 26] -Minimizing the use of invasive procedures [24] -Using manual instruments or chemical agents instead of high-speed rotary instruments [10, 12, 14, 18, 20, 22, 24] -Use of anti-retraction system in high-speed rotary instruments [8, 9, 12, 24] -Rubber dam isolation is necessary in use of hand-piece or ultrasonic instruments [4, 8, 10, 12, 13, 18, 19, 22-27, 30, 31] -Covering the patient's nose with rubber dam [9, 12] -Use of a high-speed and high-volume saliva ejector [4, 8-10, 12, 18, 22-25] -Use of extraoral radiography [4, 8, 18, 22-25] -Use of absorbable sutures [24] -Preventing the gag reflex in patients [18] -Tooth extraction in supine position [18]
Office environment	<ul style="list-style-type: none"> -Complete air sanitization and ventilation from the waiting room to the operator [8, 10, 12, 14, 16, 25, 28, 32] -Active air sanitization and ventilation system with three filters [8-10, 12, 14, 17, 24, 32] -Use of disinfecting spray after the procedure [9, 12, 22] -Wait for a few minutes after completion of treatment, and then open the door and allow the patient to leave the room [12, 22] -Windows should remain open [13] -After the patient leaves the operatory, air should be ventilated for 5 minutes before allowing the next patient to enter the operatory [13] -Activation of blower by opening the window after treatment of each patient [12, 24] -Use of ozone for disinfection of air and surfaces [8, 9, 12, 13, 24] -Use of ultraviolet light for disinfection of air and waterlines [10, 12] -Having an isolated room with negative pressure for emergency treatment of patients with acute active COVID-19 infection [4, 9, 12, 19, 23, 25] 	<ul style="list-style-type: none"> -Educational posters regarding COVID-19 should be installed on the walls [10] <ul style="list-style-type: none"> -Waiting room should always be empty [10, 12, 13, 19, 25] -Allocating a separate room for screening of patients [14, 23, 24] -The patients should not overlap. Otherwise, a minimum of 2 m distance should be considered between patients in the waiting room [8-10, 12, 13, 15, 22, 24, 25, 28] -Decorative pieces should be removed from the waiting room [10, 12, 23, 25] <ul style="list-style-type: none"> -A plastic or glass shield should be placed in front of the reception desk [9, 10, 12, 15] -Only the dentist, assistant, and patient should be allowed in the operatory [12, 21, 22, 24, 26]



Use of rubber dam: Use of rubber dam is recommended during the use of hand-piece or ultrasonic instruments in emergency cases; however, it would complicate the conduction of some dental procedures. It has been reported that if correctly placed, rubber dam can decrease the spread of infected saliva droplets and aerosols by 70% around the clinician, and can significantly decrease the risk of cross-contamination. If a rubber dam cannot be used, conservative use of manual instruments instead of rotary devices is recommended [18, 22, 24, 27].

Saliva ejector: Using a high-speed and high-volume saliva ejector or surgical suction can significantly decrease the spread of saliva droplets [4, 8, 9, 23, 25].

High-speed rotary instruments: If manual instruments cannot be used for treatment, high-speed rotary instruments equipped with anti-retraction systems should be used to decrease the spread of debris and infected droplets, and patients requiring such procedures should be scheduled as the last patient of the day [8, 9].

Air sanitation in the office: Aerosols contain living viruses; however, their infectivity progressively decreases within 3 hours, and the viruses have a mean half-life of approximately 1.1 hours. Thus, sanitation of office air from the waiting room to the operatory is of utmost importance. In treatment of each patient, a ventilation system with three filters should be turned on to clean the air in the operatory and remove the impurities and particles measuring 0.01 μm in size [14, 16, 17, 28, 32].

After completion of each procedure, a disinfecting spray should be used in the operatory, and the door should be opened after 2 minutes. In-between patients, the operatory should remain empty for a couple of minutes, the windows should be opened, and the blower should be turned on to create a safe environment for the next patient [12, 13, 22, 24]. Ozone gas may be used as a highly effective agent for disinfection of air and surfaces. Also, ultraviolet light can be used to disinfect the air and waterlines since it can decrease viral proliferation and infectivity. Emergency treatments for a COVID-19 positive patient should be performed in an isolated or negative-pressure room [9, 10, 12, 24].

Disinfection of office environment

It has been shown that the SARS-Cov2 can remain viable on plastic, glass, and metal surfaces for a maximum of 9 days. Active viability of the virus is 72 hours on plastic surfaces, 48 hours on stainless steel surfaces, 24 hours on cardboards, and 4 hours on copper surfaces. Thus, all surfaces in a dental office (in the waiting room and the operatory) should be considered potentially infected, and must be regularly and carefully disinfected with disinfecting agents after treatment of each patient. The optimal disinfecting agents for this purpose include 62%-71% ethanol, 0.5% hydrogen peroxide, 0.1% sodium hypochlorite, and isopropyl alcohol (propanol). Some authors have recommended covering all surfaces in a dental office with polyethylene wraps [9, 13, 30]. The World Health Organization recommends using 5% sodium hypochlorite diluted 1:100 for 10 minutes for surface disinfection [10, 12, 28]. Dental clinicians should wash hands with soap carefully for a minimum of 20 seconds before and after each patient. The surfactant of soap can dissolve the lipid membrane of the virus, and cause viral lysis. It has been recommended to use an alcohol-based hand sanitizer (with alcohol concentration over 60% or 70%) after handwashing with soap to cleave the viral residues [15, 26, 30]. Such protective measures should be followed even in the post-pandemic era.

Personal protection

Use of personal protective equipment should be strictly followed in the office. These include a head cover, water-resistant disposable surgical gown, gloves, goggles, face shield, and disposable shoe covers. Such equipment should be used correctly to prevent their contamination. Also, their safe disposal is highly important. The most important measure to prevent infection transmission is to use an optimal face mask, which is of utmost importance

due to aerosol-generating nature of most dental procedures [12, 16, 22, 23].

Airway protection: Surgical masks were commonly used in dental offices prior to COVID-19 pandemic which were suitable to prevent the spread of infective blood and saliva particles. However, masks with a pore size $< 50 \mu\text{m}$ should be necessarily worn for protection against COVID-19 [12, 23]. Dental clinicians and the staff should wear a face mask during their entire presence in the office. Different masks are available based on their rate of filtration of particles. During aerosol-generating dental procedures, FFP2/N95, FFP3/N99, and N100 have the highest efficacy because the COVID-19 viral particles present in air droplets have a diameter between 0.06 to 0.14 μm . Thus, both dental clinician and assistant should wear such masks [10, 14, 16, 30]. These masks can be used for a maximum of 4 hours, and then should be replaced. If the mask has a suitable condition, it may be sterilized for up to 3 times using hydrogen peroxide vapor, dry heat (70°C for 30 minutes) or moist heat (121°C) [8, 12, 13, 31]. Surgical masks can be used for non-aerosol-generating procedures or by other active staff members that are not in direct contact with patient. However, optimal fit of the mask should be ensured. Face masks without an exhalation valve provide mutual protection for both dental clinician and patient, and are preferred. If a face mask with valve is used, additional coverage with a surgical mask should be considered [12, 24].

Eye protection: Due to the possibility of virus transmission through the conjunctiva, eye protection with goggles and face shield should be considered [14, 16, 21].

Recommendations for specific fields of dentistry

Radiology: Radiographs with minimum risk of stimulation of gag reflex and coughing such as panoramic radiography, cone-beam computed tomography, and lateral oblique radiography should be requested instead of intraoral periapical and bitewing radiographs for diagnostic purposes. However, the indications and cost of these radiographic modalities should be considered as well. If intraoral radiography is necessarily required, the sensors should be double-covered for higher protection. Also, the radiology clinic should preferably email the radiographs or send them electronically instead of handing them over to patients [4, 9, 22, 25].

Endodontics and restorative dentistry: According to the American Dental Association, caries should be preferably removed with less invasive modalities such

as chemomechanical methods and use of hand instruments instead of rotary devices. If possible, in cases with symptomatic irreversible pulpitis, pain reduction with pulpotomy, pulpectomy, or vital pulp therapy should be preferred over routine root canal therapy [22, 25]. If such treatments cannot be performed, non-steroidal anti-inflammatory drugs such as 600 mg ibuprofen plus 500 mg paracetamol should be prescribed for symptomatic irreversible pulpitis, symptomatic apical periodontitis, and acute apical abscess. In case of acute infection, beta-lactam antibiotics must be temporarily prescribed. The patient should then present to well-equipped centers for treatment to eliminate the need for repeated antibiotic therapy [9, 12, 25].

Periodontics: Scaling and polishing with manual instruments should be preferred to ultrasonic devices [12, 25]. However, it is hoped that ultrasonic instruments can be used again for vaccinated patients after global vaccination and optimal control of COVID-19 pandemic. It should be noted that air ventilation is the first priority in use of ultrasonic instruments.

Oral surgery: In case of tooth extraction, high-speed saliva ejector should be used especially if the patient is in supine position. Use of absorbable sutures is also recommended. For patients with severe pain due to a severely carious tooth, extraction should be preferred to restorative procedures during the COVID-19 pandemic [25].

Prosthodontics: For recementation of loose prosthetic crowns, the patients are recommended to use an over-the-counter temporary cement, and cement their crown at home instead of presenting to a dental office. In case of misfit of a removable denture, the patients can temporarily use over-the-counter soft liners to temporarily preserve esthetics and function [25]. For disinfection of dental impressions, 1% sodium hypochlorite has been recommended (10 minutes for alginate, and 15-20 minutes for elastomeric impressions) [12].

Pediatric dentistry: Only one adult is allowed to accompany a pediatric patient, who should not be allowed in the operatory [12].

Orthodontics: All non-emergency orthodontic treatments should be postponed. Dental clinicians should not activate rapid palatal expanders during the COVID-19 pandemic peaks. Also, the parents should be instructed on how to adjust a NiTi archwire in case of emergency to prevent traumatic mucosal ulcers [12].

What would be the future of dental profession considering the ongoing global vaccination programs? Considering the repeated mutations of the virus, can dental clinicians resume their professional life? The main priority of this study was to show the feasibility of provision of dental services during the COVID-19 pandemic and also in the post-pandemic era. The patients may be asked to show their QR or vaccination link. In that case, dental clinicians and the staff would provide dental care services to patients with a more positive attitude. However, it is noteworthy that infection control has always been an inseparable part of dental profession, and face mask, gloves, and disinfection of surfaces were and always will be mandatory.

5. Conclusion

This scoping review focused on different routes of transmission of SARS-CoV-2 in a dental office setting, and offered infection control strategies in three categories: prior to entering the office, during a dental visit, and after that, in the COVID-19 pandemic era. Considering the high risk of virus transmission in dental office setting, dentists should precisely follow the protocols, and patients should be well instructed to adhere to the protocols prior to their visit to ensure safe provision of services. Considering the repeated mutations of the virus and its increasing transmissibility, poor adherence of some people to protective measures after vaccination, and publication of some inaccurate papers during the pandemic, further more precise studies are required to focus on recent variants of SARS-CoV-2.

Ethical Considerations

Compliance with ethical guidelines

This study was part of a project with the ethics code conducted at Guilan University of Medical Sciences, Iran (Code: IR.GUMS.REC.1400.255).

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Authors' contributions

Conceptualization and Supervision: Maryam Rabiei; Methodology: Maryam Rabiei; Investigation, Writ-

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Conflict of interest

The authors declared no conflict of interest.

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