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Review Article

Protection Measures, Dental Education, and Covid-19 Spread: A Brief Narrative Review

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ABSTRACT

Objectives: The aim of the study was to evaluate and check the international literature for Covid-19 prevention and dental education. **Materials and Methods:** A review of the international literature was performed, including articles in English about different aspects of transmission, preventive actions, and educational topics. **Results:** As a result, it seems that the better way to avoid contagion was represented by the use of personal protective equipment and handwashing in conjunction with social distancing and treatment limitation. **Conclusions:** Dental treatment limitation to emergencies, social distancing, and online teaching seemed to be the key to limit the Covid-19 outbreak, although there was no evidence of a universal guideline. This suggests that we have to establish general guidelines to avoid a second rush of contagion and limit the spread of infection in the future.

Keywords: *Covid-19 prevention, dental education, dentistry*

Introduction

Covid-19 outbreak has tremendously conditioned the lives and professional habits of the whole world population and posed significant challenges to medicine and dentistry, and for dental and medical schools. The initial Chinese outbreak has rapidly spread in the world, and Italy has been the second country that experienced a bursting breakout similar to that one in Wuhan.

World Health Organization (WHO) declared the status of the pandemic in the half of March 2020, after a period of huge spreading of the virus worldwide. The only measure to contain the spreading of the virus seemed to enter in a lockdown, and that measure has given the expected result in terms of reduction of the diffusion speed.

At now, there are not clearly stated guidelines to follow to avoid a second outbreak, and the countries are trying to establish treatment protocols to start activities and contemporary avoid a second outbreak of pathology.

This aspect seems to be of primary relevance for dental education and practice, although there are no guidelines as previously said above.

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The aim of this work was to investigate the outbreak amount in Italy and point out some suggestions for the dental teacher and practitioner to avoid self and other contagions.

Materials and Methods

We performed both a not systematic literature review through PubMed, and an evaluation of Italian contagion data from Epicentro, the epidemiologic portal of Istituto Superiore di Sanità (ISS), which publishes daily the outbreak data.

The research was conducted starting in May onwards with a few MeSH and keywords, as listed below:

- Covid-19
- Dentistry
- Coronavirus, epidemiology
- Coronavirus, infections/preventing and control

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- Infections control
- Dental care/standards
- Hand disinfection and Covid
- Languages were limited to English, no articles without abstract were considered.

The author selected articles matching the following inclusion criteria:

- articles in English
- full-text articles with abstract

Data from articles were compared in discussion and related to possible outcomes described in every single paper. No statistical analysis was performed on the extracted data.

Results

Twenty papers according to inclusion criteria were selected to be included in the study. Studies with a specific pathology focus different from Covid-19 were not included.

Discussion

As a matter of fact, there are few considerations and guidelines about dental treatments and the same lack of information is about dental teaching programs.

Sars-CoV-2 had a great diffusion in Wuhan, the capital of Hubei in China, at the beginning of this year, and in February we have seen the same pathology spread in Northern Italy.

After an initial period, a progressive lockdown was established in Italy, and dental treatments were stopped except for emergency procedures. Dental education was stopped and a formal online teaching was started.

According to the data from Epicentro about the contagion in Italy, 29,692 Sars-CoV-2 deaths were recorded as of May 14, 2020, the median age of death was 80 years, on the median age of infection of 62. As for patients who died in hospital (2848), in whom it was possible to establish comorbidities, it was seen that 68.1% had hypertension, 30.5% had type 2 diabetes, and other comorbidities. Interestingly, the percentage of deceased increased as well as comorbidities growth. Acute Respiratory Distress Syndrome was observed in the majority of patients (96.8%).[1]

With reference to dental treatments, Meng *et al.*[2] reported an effective treatment of more than 700 patients during the Covid-19 outbreak since January 24, mostly pulpectomy and/or dental extractions. Mouthrinse, rubber dam, high-volume saliva ejectors, and proper IDP (facial mask, goggles, facial shield, and gloves) were used to reduce the transmission risk, just like scheduling of every dental procedure on patients suspected to be positive although asymptomatic as the last in the day.

Although patients diagnosed with Covid-19 infection are definitely not supposed to receive dental treatments, as underlined by Khader *et al.*,[3] emergencies can occur, and the possibility that a patient is positive to infection without any symptom is threatening for dentists.

Moreover, knowledge about contagion during respiratory disease epidemy seems to be lower than in other healthcare workers.

The main source of transmission seems to be the symptomatic patient, although the asymptomatic one could be responsible in the same way.[2]

In fact, human transmission of SARS-CoV-2 is mainly through respiratory aspirates, droplets, contacts, feces, and aerosols.

Moreover, the basic reproductive volume is considered between 2 and 3.5, a very high rate, considering that one patient could spread the infection to two to three other people, despite no or mild symptoms.[4]

Since the possibility of transmission was via droplets, particular attention should be paid to eye protection, mostly for the hypothesis that the virus could enter the tears through droplets and could reach the nose and the respiratory tract via the nasolacrimal duct.[5]

For the reasons above, dentists seem to be the most exposed to the spread of infection, more than other health workers, such as nurses and physicians.[6]

Children seem to have similar but milder symptoms to adults, so far they have to be considered as potential carriers of Sars-CoV-2 unless proved otherwise.[7]

Sars-CoV-2 enters the cells through ACE2 receptors and it is present in the saliva of infected individuals, spreading the virus although possible asymptomatics. In light of that consideration, dental care settings carry the risk of transmission via airborne spread, contact spread, and via contaminated surfaces spread.[8]

The identification of Covid-19 in the saliva of infected patients suggests also that dental practitioners could be the first evaluation caregivers through a salivary test, which could be less invasive and discomfortable than the nasopharyngeal swab.[9]

People at high risk of contagion are represented by health care workers, such as nurses, physicians, and obviously patients.[2]

Even though lockdown and quarantine seemed to be the last choice, these procedures are designed to

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reduce the spread of a pathology in a specific area. Data collected showed that the transmission continued unless the most cogent measures have been taken.

In a theoretical way, if all cases could be isolated, the spread would decline faster.[10]

Another recommendation is represented by the reduction of the staff components present during evaluation and therapeutic procedures, as proposed by Moravvej *et al.*[11]

Precheck triages by question about medical and travel history, health status, temperature, and respiratory problems should be done by telephone, and at the entrance of the dental cabinet.[2]

Izzetti *et al.*[12] seem to be of the same opinion, underlining that dental practitioners should perform a phone triage to define both the real need of the dental treatment and the health history of the patient.

At the admission to the dental office, a second triage should be done, in addition to temperature evaluation and hand disinfection.[8,12]

It has been highlighted that the virus transmission is mainly through droplets, saliva, and aerosols, a prophylactic measure could be represented from antiseptic rinses to reduce the infectious amount.[2,6]

Oral Disinfection

Mouthrinses with 0.2–1% povidone, instead of 0.05–0.1% of cetylpyridinium chloride or 1% hydrogen peroxide are recommended by Izzetti *et al.*,[12] although there is no evidence of proven efficacy.

A special point should be made about the efficacy of chlorhexidine mouth rinses against Sars-CoV-2, which seems to be inefficient against the virus.[8]

On the other hand, a specific formula, including Cyclodestrins combined with Citrox, to enhance the delivery system and the efficacy against the virus could lower the viral load and reduce the nasopharyngeal microbiota.[13]

Another mouth rinse that seems to be effective against the virus is represented by cetylpiridinuim chloride, and its use is validated as an antiviral agent through the destruction of the viral capsid.[14]

Hand Cleaning

Hand hygiene seems to be the best option considering that the virus is inactivated by water, soap, and alcohol.[2,6]

Although it should be a normal routine practice in 2020, appropriate handwashing techniques should be performed between each patient and represent a strategy of utmost importance.[8,11]

From that point of view, hand cleaning could be carried out in various ways, although traditional handwashing with soap and sanification by means of an alcoholic solution seems to be the preferred one, is strongly recommended for health caregivers, to protect both themselves and the patients from infection.[15]

On the other hand, we should be aware that continuous handwashing, for example, the kind that health caregivers practice, could lead to hand skin lesions, and the lesion is an open door to the virus.[16]

Personal Protective Equipment

Rubber dam isolation, anti-retraction handpiece, mouth rinses, gloves, gowns are recommended, just as for any other contagious infections from the Center for Disease Control (CDC), American Dental Association (ADA), and World Health Organization (WHO).[3]

Facial surgical masks should be worn by every people involved in treatment to reduce the possibility to spread the virus, and the use of N95, or similar like FFp2 is suggested.[17]

As reported previously, wearing masks by healthy persons may prevent potential asymptomatic or presymptomatic transmission, and this could lead to contagion lowering.[18,19]

Moravvej *et al.*[11] seem to be of the same opinion, as they recommend that the operators have to be protected by latex gloves, eye protection, face mask, long-sleeved fluid-resistant gowns, and disposable shoe covers.

The same idea is shared by Izzetti, who emphasizes the necessity of personal protection devices, such as goggles, face mask (filtering facepiece 2 or 3), long-sleeved gowns, and similar.[12]

Peng *et al.*[8] highlighted the need of a specific protection for specific situations.

Primary protection is required for staff (working cap, surgical mask, working clothes, goggle or face shield, gloves).

Secondary protection is mandatory for the dental team and is based on the same stuff, but disposable isolation clothes or surgical disposable clothes and a second pair of gloves are recommended.

Tertiary protection, including special protection, clothes are required with patients having a diagnosis of 2019-nCoV infection; nevertheless, this kind of patient is not supposed to be treated in a dental clinic.[8]

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Aerosols producing activities should be avoided.[6] To prevent and limit unnecessary aerosols production, handpiece use should be limited and dental procedures should be performed manually whenever it is possible. For the same reason, dental treatment should not be over 15 min, to prevent unnecessary exposure, as well as the instruments should be prepared in advance.[8,12]

The use of anti-retraction handpieces is strongly recommended.[8]

Disinfection and sanitation procedures seem to be well known by dentists and dental staff too, although the Covid-19 disease is seen as moderately dangerous.[3]

Due to the resistance of SARS-CoV-19 over surfaces, that is estimated to resist for up to 72 h, these should be properly cleaned after each procedure, by means of disinfecting agents.[2,7]

Personal protective equipment should be removed only at the end of the dental procedures and after the exit from the contaminated area.[12]

Dental Education

As reported by Meng *et al.*, on the basis of their experience with SARS, dental education during the outbreak was based certainly on online lectures and case studies, to minimize the risk of unnecessary exposition to the pathogenic agent, as well as the self-learning actions were encouraged, and the same idea is supported from Coulthard.[2,20] The online lessons started on February 17. At the same time, according to Wong *et al.*, in a study on 215 healthcare students, which analyzed the stress generated by the epidemic outbreak of SARS in Hong Kong, with particular reference to disease-associated fears and pressure, they considered that dental schools should be prepared to give psychological support to those students who need that.[2,21]

Sars-CoV-2 spread conditioned dental practice and dental teaching terribly, and in the very next future, treatment possibilities and procedures will have a change in the cross-infection control standards.

Throughout the outbreak period, we had to act to preserve health of our students, and we decided to improve prevention actions to limit the spread of infection.

In our University, every education-related activity was shifted toward online lessons and examinations, limiting the access to University to those people who cannot afford the online plan from home.

Dental treatments and hands-on teaching procedures were shifted to online theoretical lessons.

Although this solution seemed to be safer, we will have to evaluate the real impact on learning practical activities such as oral hygiene by means of theoretical lessons.

An alternative way was represented by hands-on work in a dentistry model classroom, in which students can perform therapeutical activities on a mouth model without any risk of aerosol pollution.

Second outcome bias (Dental education)

Due to the limited research, we have to identify obtained results as temporary and underdevelopment, mostly related to the continuous evolution of pathology knowledge. Bias of this section (Dental education) is related to the evolution of the situation in every nation in which the problem is observed. The principal bias is represented by the differences in approaching and managing the problem, different for every nation and in a total absence of clear guidelines.

Conclusion

This scenario could lead to a major revision of basic settings of a dental practice, mostly in minimizing infections spread, such as pre- and post-operative cleaning and sanification procedures of surfaces and instruments, and the evolution toward anti-retractions handpieces as a gold standard of production for dental rotating instruments to avoid cross-infections.

Medical and dental education as well will need a supplemental support, mostly due to the mental overload in relation to the need to treat patients and the psychological pressure related to the fear of contagion.

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Conflicts of interest

There are no conflicts of interest.

Authors contributions

Authors equally contributed to the paper

Ethical policy and institutional review board statement

Not applicable.

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As reported in cited literature.

References

1. https://www.epicentro.iss.it/en/coronavirus/bollettino/Report-COVID-2019_14_may_2020.pdf

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2. Meng L, Hua F, Bian Z. Coronavirus disease 2019 (COVID-19): Emerging and future challenges for dental and oral medicine. J Dent Res 2020;99:481-7. doi:10.1177/0022034520914246
3. Khader Y, Al Nsour M, Al-Batayneh OB, Saadeh R, Bashier H, Alfaqih M, *et al*. Dentists' awareness, perception, and attitude regarding COVID-19 and infection control: Cross-sectional study among Jordanian dentists. JMIR Public Health Surveill 2020;6:e18798.
4. Wang Y, Wang Y, Chen Y, Qin Q. Unique epidemiological and clinical features of the emerging 2019 novel coronavirus pneumonia (COVID-19) implicate special control measures [published online ahead of print, 2020 Mar 5]. J Med Virol 2020. doi:10.1002/jmv.25748
5. Qing H, Li Z, Yang Z, Shi M, Huang Z, Song J, *et al*. The possibility of COVID-19 transmission from eye to nose. Acta Ophthalmol 2020. [published online ahead of print, 2020 Mar 18] doi:10.1111/aos.14412.
6. Spagnuolo G, De Vito D, Rengo S, Tatullo M. COVID-19 outbreak: An overview on dentistry. Int J Environ Res Public Health 2020;17:2094. doi:10.3390/ijerph17062094
7. Mallineni SK, Innes NP, Raggio DP, Araujo MP, Robertson MD, Jayaraman J. Coronavirus disease (COVID-19): Characteristics in children and considerations for dentists providing their care. Int J Paediatr Dent 2020;30: 245-50.
8. Peng X, Xu X, Li Y, Cheng L, Zhou X, Ren B. Transmission routes of 2019-nCoV and controls in dental practice. Int J Oral Sci 2020;12:9. doi:10.1038/s41368-020-0075-9
9. Sabino-Silva R, Jardim ACG, Siqueira WL. Coronavirus COVID-19 impacts to dentistry and potential salivary diagnosis. Clin Oral Investig 2020;24:1619-21.
10. Sjödin H, Wilder-Smith A, Osman S, Farooq Z, Rocklöv J. Only strict quarantine measures can curb the coronavirus disease (COVID-19) outbreak in Italy, 2020. Euro Surveill 2020;25:2000280. doi:10.2807/1560–7917.ES.2020.25.13.2000280
11. Moravvej Z, Soltani-Moghadam R, Ahmadian Yazdi A, Shahraki K. COVID-19 pandemic: Ophthalmic practice and precautions in a tertiary eye hospital in Iran. Infect Control Hosp Epidemiol 2020;41:1237-8.
12. Izzetti R, Nisi M, Gabriele M, Graziani F. COVID-19 transmission in dental practice: Brief review of preventive measures in Italy. J Dent Res 2020;99:1030-8.
13. Carrouel F, Conte MP, Fisher J, Gonçalves LS, Dussart C, Llodra JC, *et al*. COVID-19: A recommendation to examine the effect of mouthrinses with β-cyclodextrin combined with citrox in preventing infection and progression. J Clin Med 2020;9:E1126. doi:10.3390/jcm9041126
14. Baker N, Williams AJ, Tropsha A, Ekins S. Repurposing quaternary ammonium compounds as potential treatments for COVID-19. Pharm Res 2020;37:104.
15. Hillier MD. Using effective hand hygiene practice to prevent and control infection. Nurs Stand 2020;35:45-50.
16. Cavanagh G, Wambier CG. Rational hand hygiene during the coronavirus 2019 (COVID-19) pandemic. J Am Acad Dermatol 2020;82:e211. doi:10.1016/j.jaad.2020.03.090
17. Ağalar C, Öztürk Engin D. Protective measures for COVID-19 for healthcare providers and laboratory personnel. Turk J Med Sci 2020;50:578-84. doi:10.3906/sag-2004–132
18. Chiang CH, Chiang CH, Chiang CH, Chen YC. The practice of wearing surgical masks during the COVID-19 pandemic. Emerg Infect Dis 2020;26:1962.
19. Feng S, Shen C, Xia N, Song W, Fan M, Cowling BJ. Rational use of face masks in the COVID-19 pandemic. Lancet Respir Med 2020;8:434-6.
20. Coulthard P. Dentistry and coronavirus (COVID-19)–moral decision-making. Br Dent J 2020;228:503-5. doi:10.1038/s41415-020-1482-1
21. Wong JG, Cheung EP, Cheung V, Cheung C, Chan MT, Chua SE, *et al*. Psychological responses to the SARS outbreak in healthcare students in Hong Kong. Med Teach 2004;26:657-9.

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