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| COMMUNICATION

Restorative dental treatment in times of COVID-19

Tratamento dentário restaurador em tempos de COVID-19

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ABSTRACT

Since the outbreak of the Coronavirus Disease 2019 (COVID-19), caused by the Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2), numerous restrictive measures have been adopted by governments of different countries. The return to elective dental care in Brazil is a reality even during the COVID-19 pandemic. During restorative dental procedures, the dental professional requires close contact with the patient, being exposed to contaminated saliva and fluids. In addition, transmission of COVID-19 by the generation of aerosol produced by dental handipieces may be possible. Thus, the dental staff must know how to act during restorative dental procedures, putting into practice the correct clinical protocols to avoid cross-contamination and COVID-19 spread. The purpose of this article is to review the literature on the biosafety practices especially in the context of restorative dental procedures in times of COVID-19.

Indexing terms: Betacoronavirus. Coronavirus infections. Dental offices. Dentistry.

RESUMO

Desde o surgimento da COVID-19, causada pelo coronavírus da Síndrome Respiratória Aguda Grave 2 (SARS-CoV-2), inúmeras medidas restritivas foram adotadas pelos governos de diferentes países. O retorno ao atendimento odontológico eletivo no Brasil uma realidade mesmo durante a pandemia do COVID-19. Durante procedimentos odontológicos restauradores, o profissional de odontologia requer contato próximo com o paciente, sendo exposto a saliva e outros contaminantes. Além disso, a transmissão de COVID-19 pela geração de aerossol produzido por peças de mão odontológicas pode ser possível. Assim, a equipe odontológica deve saber agir em durante o procedimento restaurador, colocando em prática os protocolos clínicos corretos para evitar a contaminação cruzada e a disseminação do COVID-19. O objetivo deste artigo é revisar a literatura sobre as práticas de biossegurança, especialmente no contexto de procedimentos odontológicos restauradores em tempo de COVID-19.

Termos de indexação: *Betacoronavirus; Infecções por coronavirus. Consultórios odontológicos. Odontologia.*

INTRODUCTION

The outbreak of the Coronavirus Disease 2019 (COVID-19), caused by the Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2), has spread from Wuhan city, in China, to other provinces and countries in late December 2019 [1,2]. The World Health Organization (WHO) declared the COVID-19 as international health

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emergency on 30 January 2020 [1-3]. COVID-19 affected the economy and health systems of several countries [4,5]. According to the most recent data from the Johns Hopkins Coronavirus Resource Center (coronavirus.jhu.edu/), the global number of confirmed cases of COVID-19 was 9.129.793 with 472.793 deaths on June 23.

The incubation period of COVID-19 was estimated to be 5 to 14 days [2,3]. COVID-19 positive patients may experience fever, dry cough, dyspnea, fatigue, muscle pain, headache, sore throat, diarrhea, vomiting, ageusia, anosmia and mucocutaneous manifestations [2,3,6,7]. According to the symptoms and their intensity, the cases can be classified as mild (26%), moderate (65%) or severe (9%). The severe cases are often associated with later ages and the existence of comorbidities (diabetes, hypertension, cardiovascular diseases; respiratory problems, obesity, immunosuppression) [8].

The contact with symptomatic or asymptomatic patients, without adequate individual protection, brings to health professionals a high risk of infection, especially physicians, physiotherapists, nurses and dentists [1-3,9]. The last, due to the physical proximity to the patients (face to face), frequent exposure to saliva, blood and other fluids, production of aerosols, in addition to contaminated manual cutting instruments, presents high chances of contamination and cross-infection during dental care [1,9-12].

To reduce the spread of SARS-Cov-2, the Brazilian Federal Council of Dentistry and the Brazilian Health Regulatory Agency recommended dental care to be performed only in cases of urgencies and emergencies following strict infection control guidelines [13-15]. The return to elective dental care in Brazil is a reality. The professional must observe that the risk of cross-infection may increase according to the procedure. The purpose of this article is to review the literature on the biosafety practices especially in the context of restorative dental procedures in times of COVID-19.

The dental practice may predispose the COVID-19 dissemination due to the procedures, which involve face-to-face communication and frequent exposure to saliva, blood and other body fluids. In addition, during the procedures, concerns remains on contaminated saliva droplets and produced aerosols [1,4,9-12,14-18].

Patient reception and waiting room

A telephone triage should be considered to assess the patient's current signs and symptoms. In suspected cases, it is recommended that the patient do not attend dental services. In cases where patient attendance is indicated, it is important that the professionals are able to identify suspected cases of COVID-19. The body temperature must be the evaluated using a digital forehead thermometer as it does not require physical contact. Then, a clinical pre-treatment questionnaire must be applied to patient [9,16]. The questionnaire should address questions regarding fever, respiratory problems, travel to endemic areas, and contact with confirmed or suspected cases of COVID-19 [9].

It is important that the patient respect the scheduled appointment time and the dentists pay attention to the time between each patient. The time to carry out all recommendations for disinfection of the dental office should also be respected [4,9,14-16].

In the waiting room, clear instructions in order to not disseminate infections should be given. Sink with soap and water for hand washing and hand sanitizer (70% alcohol gel) should be easily available. It must be ensured that all patients receive surgical masks. A distance of at least 1m between the patients should be respected [4,9,16].

Use of Personal Protection Equipment (PPE)

Personal protective equipment (masks, surgical caps, gloves, lab coats, waterproof disponible gowns, goggles and face shields) must be available daily as they promote an effective barrier against most generated aerosols [4,9,10,14,16,18-20].

Masks

Surgical mask should be used in procedures at least 1m from the patient and changed constantly. They must not be touched or placed on the neck and pockets. When performing aerosol generation procedures, a N95 respirator must be chosen. The N95 respirator with an exhalation valve are not recommended dentistry as it provide low resistance during exhalation. In addition, it is a vulnerable component of a respirator and under actual

working conditions may become dirty or damaged to the point of causing significant leakage [21]. The exhaled air may contaminate patients and the environment if the professional is infected. The N95 or PFF2 mask must be changed if dirty.

Gloves

Gloves should be used when there is a risk of contact with blood, body fluids, secretions, mucous membranes and skin as well as contaminated dental instruments or equipment.

Lab coats and disposable gowns

Lab coats or disposable gowns with long sleeves, thumb-loop/knitted cuff wrists and open back/closure back design must be used. They must be non-allergenic, resistant and provide an effective antimicrobial barrier.

Goggles and face shields

The COVID-19 may also be transmitted through contact with the mucous membranes of the eyes, so it is essential to wear goggles. Eyeglasses are not considered personal protective equipment as they do not have side shields. Face shields should be used to provide broader protection, reducing contact between droplets/aerosols with the professional's face and the surgical mask or respirator.

The dental healthcare personnel must learn the proper care, maintenance, useful life, and disposal of the personal protective equipment. The professional must remove all the personal protective equipment before leaving the dental office. Between each appointment, disinfection of goggles and face shield should be performed by washing with soap and water and 70% alcohol [9,16].

Hand washing

There is a growing awareness of the importance of hand washing. Epidemiological studies show that hand washing with soap and water and disinfection with 70% alcohol gel are effective in controlling the transmission of COVID-19. The 70% alcohol gel is effective only if your hands are not visibly dirty [4,9,10].

Mouthwashes with hydrogen peroxide

Mouthwashes prior to dental treatment are recommended to reduce the amount of microorganisms on the oral surfaces. In addition, before the procedures, the patients can be asked to brush their teeth without denfrice in appropriate room. Mouthwash with 0.12% chlorhexidine, usually used in dentistry, did not prove to be the most effective in preventing the transmission of Coronavirus. The use of Hydrogen Peroxide 1% or 1.5% (9ml for 30 seconds) is seen as the most effective agent to be used prior to treatment. This procedure should be performed after a consistent reduction of residual saliva, by continuous aspiration. This procedure should be performed before the subsequent use of 0.12% or 0.2% chlorhexidine [4,9,15,22].

Recommendations regarding dental restorative procedures

Dental handpieces

Handpieces are frequently used in cavity preparation during restorative dental procedures. In view of the current situation, anti-retraction dental handpieces with specially designed anti-retractive valves or other anti-reflux designs are strongly recommended in order to avoid cross-contamination as they reduce the reflux of oral bacteria in the tubes of the handpiece and dental unit and the production of aerosols [9,16,22]. In addition, they should be sterilized after each appointment [9,22].

Water spray

To avoid the high production of aerosols, the use of the high speed handipiece without abundant water spray is the most recommended. It is not recommended to use the triple syringe. In addition, the frequent use of spitpan, aspirators or cotton to dry the area is not recommend as the contamination of air and water tubes can occur inside the dental unit [10,15,16].

Rubber dam isolation

Rubber dam isolation of the operative field during cavity preparation whenever the procedure permits should

be used. This significantly minimizes the production of contaminated aerosol or prevents spills of contaminated saliva and blood, particularly in cases where use high-speed handpieces are required [4,9,10,16,22].

Suction pumps

High-powered suction systems are necessary during restorative procedure to eliminate infectious droplets as soon as they are emitted, and thereby minimizing their dispersion in the air. It is also important to clean the suction device filters at the end of each appointment with chlorine-based disinfectant (2.5 - 5% sodium hypochlorite [10,15].

Cavity preparation

In cases where rubber dam isolation is not possible as well as in elective cases, one should opt for manual removal of carious tissue by using dentine excavators [4,9,15,16]. The use of chemical caries removal techniques should also be considered [4].

Dental X-rays

Preferences should be given to panoramic radiographs or cone beam computed tomography. Intra-oral radiographs stimulate salivation and coughing during image acquisition [15,17]. Minimal sedation might also be considered to control the vomiting reflex in some procedures [10].

Adhesive dental materials

A minimum time permanence in the dental office can minimize the chances of cross-infection. Materials that guarantee a reduced clinical time are recommended. Universal adhesive systems are products easy to use since the same product has several technical possibilities [23,24]. To reduce the clinical time, preferences should be given to Bulk-Fill composite resins as it permits increments of up to 4mm in thickness [25,26]. It is clear the benefits that these materials provide in a matter of reduced clinical time for the professional during dental restorative care in times of COVID-19.

Urgencies and emergencies in Dentistry

In view of the recommendations of the Brazilian Federal Council of Dentistry, during the COVID-19 pandemic, only emergency and urgent care is recommended [14,15]. Dental emergencies are procedures that do not present a risk of death but that require intervention to relieve discomfort such as pain [7,14,15]. The restorative procedures that are considered dental emergencies are dental trauma, extensive caries or defective restorations that cause pain and fabrication of provisional restorations if the restoration is lost, broken or is causing gingival irritation.

Surfaces disinfection

All contaminated surfaces need to be cleaned and disinfected correctly at the end of each patient appointment, which include the dental office, common areas, equipment, door handles, chairs, tables, floor and walls [9,22]. 62-71% ethanol, 0.1% sodium hypochlorite and 50% quaternary ammonia can be used for cleaning and disinfection. Other biocidal agents, such as 0.05-0.2% benzalkonium chloride or 0.02% chlorhexidine digluconate are also agents of choice, but are less effective. Protective barriers must be changed each appointment as the SARS-Cov-2 survives for approximately 2 to 9 days on surfaces [9,16,22].

Waste management in dental office

Waste produced after performing procedures in patients with suspected or confirmed coronavirus infection is considered infectious medical waste. Disposal of contaminated materials such as gloves and masks must be done after each visit and packed in closed plastic bags identified as infectious [10,16]. The dental instruments and dental high and low speed handpiece must be sterilized. Care must be taken in the handling of dental materials to not promote cross-infection [16].

CONCLUSION

In order to minimize COVID-19 spread, recommendations for safe dental care are necessary.

Dental professionals must be aware of the signs and symptoms of COVID-19, and the control measures in avoid the spread of the disease.

To minimize contamination and cross-infection, the dental office must implement strict biosafety measures before, during and after procedures.

Collaborators

RL GOMES contributed to the conception and design, performed the analysis and interpretation, wrote the manuscript and final approval of the version to be submitted. MS PEDROSA contributed to analysis and interpretation, critically revised the manuscript and final approval of the version to be submitted. CHV SILVA contributed to conception and design, performed the analysis and interpretation, critically revised the manuscript, and final approval of the version to be submitted.

REFERENCES

1. Guan W-j, Ni Z-y, Hu Y, Liang W-h, Ou C-q, He J-x, et al. Clinical characteristics of coronavirus disease 2019 in China. N Engl J Med. 2020;382(18):1708-20. https://doi.org/10.1056/NEJMoa2002032
2. Del Rio C, Malani PN. COVID-19 – new insights on a rapidly changing epidemic. Jama. 2020;323(14):1339-40. https://doi.org/10.1001/jama.2020.3072
3. Rezabakhsh A, Ala A, Khodaie SH. Novel coronavirus (COVID-19): a new emerging pandemic threat. J Res Clin Med. 2020;8(1):5.
4. Ge Z-y, Yang L-m, Xia J-j, Fu X-h, Zhang Y-z. Possible aerosol transmission of COVID-19 and special precautions in dentistry. J Zhejiang Univ Sci B. 2020;21(5):361-368. https://doi.org/10.1631/jzus.B2010010
5. Nicola M, Alsafi Z, Sohrabi C, Kerwan A, Al-Jabir A, Iosifidis C, et al. The Socio-Economic Implications of the Coronavirus and COVID-19 Pandemic: a review. Int J Surg. 2020;78:185-193. https://doi.org/10.1016/j.ijsu.2020.04.018
6. Galván Casas C, Català A, Carretero Hernández G, Rodríguez-Jiménez P, Fernández Nieto D, Rodríguez-Villa Lario A, et al. Classification of the cutaneous manifestations of COVID-19: a rapid prospective nationwide consensus study in Spain with 375 cases. Br J Dermatol. 2020. https://doi.org/10.1111/bjd.19163
7. Meng L, Hua F, Bian Z. Coronavirus disease 2019 (COVID-19): emerging and future challenges for dental and oral medicine. J Dental Res. 2020;99(5):481-7. https://doi.org/10.1177/0022034520914246
8. Bi Q, Wu Y, Mei S, Ye C, Zou X, Zhang Z, et al. Epidemiology and transmission of COVID-19 in 391 cases and 1286 of their close contacts in Shenzhen, China: a retrospective cohort study. Lancet Infec Dis. 2020. https://doi.org/10.1016/S1473-3099(20)30287-5
9. de Campos Tuñas IT, da Silva ET, Santiago SBS, Maia KD, Silva-Júnior GO. Doença pelo Coronavírus 2019 (COVID-19): uma abordagem preventiva para Odontologia. Rev Bras Odontol. 2020;77:1-7.
10. Tiwari RVC. Dental considerations in Corona Virus Infections: First review in literature. J Adv Med Dental Sci Res. 2020;8(2). https://doi.org/10.21276/jamdsr
11. Sabino-Silva R, Jardim ACG, Siqueira WL. Coronavirus COVID-19 impacts to dentistry and potential salivary diagnosis. Clin Oral Inv. 2020;24:1619-1621.
12. Xu J, Li Y, Gan F, Du Y, Yao Y. Salivary glands: potential reservoirs for covid-19 asymptomatic infection. J Dental Res. 2020:0022034520918518. https://doi.org/10.1177/0022034520918518
13. Guo H, Zhou Y, Liu X, Tan J. The impact of the COVID-19 epidemic on the utilization of emergency dental services. J Dental Sci. 2020 [in press]. https://doi.org/10.1016/j.jds.2020.02.002
14. Associação de Medicina Intensiva Brasileira. Conselho Federal de Odontologgia. Recomendações A, para atendimento odontológico COVID C. Comitê de Odontologia AMIB/CFO de enfrentamento ao COVID-19 Departamento de Odontologia AMIB–1 Atualização 25/03/2020. São Paulo: AMIB; 2020.
15. Brasil. Agência Nacional de Vigilância Sanitária. Nota técnica GVIMS/GGTES/ANVISA Nº 04/2020. Orientações para Serviços de Saúde: Medidas de Prevenção e Controle que devem ser adotadas durante a assistência aos casos suspeitos ou confirmados de infecção pelo novo Coronavírus (SARS-COV-2). Brasília: ANVISA; 2020.
16. Franco JBC, Rodrigues A, Peres MPSM. Cuidados odontológicos na era do COVID-19: recomendações para procedimentos odontológicos e profissionais. Rev Assoc Paul Cir Dent. 2020;74(1):18-21.
17. Thomé GB, Rocha S, Guandalini S, Sérgio; Guimarães MCV. Manual de boas práticas em biossegurança para ambientes odontológicos. Curitiba: Faculdade Ilapeo; 2020.
18. Pinto MMdS, editor. Manual sobre prevenção e tratamento do Covid-19. Barreiras: [s.n.]; 2020.
19. Al-Mutairi NT, Almukhalfi HS. Evaluation of Knowledge of restorative dental staff about personal protective equipments at selected dental clinics, Saudi Arabia. Int J Sci Res. 2017;6(1):1236-1239.
20. Coulthard P. Dentistry and coronavirus (COVID-19)-moral decision-making. Br Dent J. 2020;228(7):503-505. https://doi.org/10.1038/s41415-020-1482-1
21. Bellin P, Hinds WC. Aerosol penetration through respirator exhalation valves. Am Ind Hyg Assoc J. 1990;51(10):555-60. https://doi.org/10.1080/15298669091370095
22. 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(1):9. https://doi.org/10.1038/s41368-020-0075-9
23. Nagarkar S, Theis-Mahon N, Perdigão J. Universal dental adhesives: Current status, laboratory testing, and clinical performance. J Biomed Mater Res B Appl Biomater. 2019;107(6):2121-2131. https://doi.org/10.1002/jbm.b.34305

24. Avelar WV, Medeiros AF, Campos F, Vasconcelos RG, Vasconcelos MG. Sistemas adesivos universais: composição, indicações, vantagens e desvantagens. Rev Salusvita (Online). 2019:155-75.

25. Torres AE. Resina bulk fill: relato de caso clínico. Porto Alegre: Universidade Federal do Rio Grande do Sul; 2017.

26. Chesterman J, Jowett A, Gallacher A, Nixon P. Bulk-fill resin-based composite restorative materials: a review. Br Dent J. 2017;222(5):337-344. https://doi.org/10.1038/sj.bdj.2017.214

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