COVID-19 prevention, control and management during dental care in a school clinic

Ana de Lourdes Sá de Lira*; Sávio Henrique Lira Campos; André Vinícius Lira Campos**; Breno Wesley Leal Carvalho***; Levy Castelo Branco de Paulo*****

* Associate professor, School of Dentistry, Universidade Estadual do Piauí
** Graduate student, School of Medicine, Universidade Federal do Piauí
*** Graduate student, School of Dentistry, Universidade Estadual do Piauí

Received: 09/21/2022. Approved: 10/19/2022.

ABSTRACT

This study investigated the effectiveness of physical and mechanical barriers in the prevention, control and management of COVID-19 during dental care. In this cross-sectional study, two research students from the eighth period of the dentistry course performed 24 consultations from January to June 2022, in the 4 specialties under study: surgery (S), restorative dentistry (D), endodontics (E) and periodontics (P). For each specialty researched, there were 3 groups: control (CG), which adopted the current biosafety norms of the Federal Council of Dentistry (FCD); with circular shield (G1) and with rectangular shield (G2). For each specialty, the researcher performed 6 dental appointments, whose patients were chosen by lot to which group they would participate, so that the distribution was equitable between the groups. Aerosol stains were found around office equipment, as well as on professionals' personal protective equipment (PPE) and close to the patient. The maximum distance found from aerosol splashes to the naked eye was 1.43m during prophylaxis procedures in the CG. In all groups, most of the splashes were found on the PPE used by professionals, especially on gloves, in the professionals' wrist region; on the patient, on the apron and neck. There was no statistically significant difference between the groups within the specialties (p-value > 0.05), disregarding the comparison between pairs. It was concluded that there was dissemination of aerosol droplets in all dental visits in the 4 specialties studied. Although the PPE proposed by the FCD are effective as a physical barrier to reduce cross-infection and the spread of droplets and aerosols, as well as a preventive measure against COVID-19 during dental care, the professional can use other devices that demonstrate effectiveness, such as the circular screens and the acrylic box, during the dental procedures.

Descriptors: Pandemic. Dentistry. Prevention.

1 INTRODUCTION

COVID-19 is a viral infection caused by the novel coronavirus SARS-CoV-2, which was first detected in a hospital in Wuhan and likely originated at the seafood market in Huanan, China, in late 2019[1]. Based on genetic and

epidemiological research findings, the COVID-19 outbreak began with a single animal-to-human transmission, followed by sustained human-to-human spread. Currently, it is believed that its interpersonal transmission occurs mainly through the respiratory route by direct or indirect contact or by droplets, and can be transmitted directly or indirectly by saliva[2,3]. In addition, SARS-CoV-2 has been observed to spread through aerosols or vertical transmission (from mothers to newborns)[4]. As conjunctivitis has been found in some patients, the literature has suggested that eye exposure may provide an effective way for the virus to enter the body[5]. The fact is that both symptomatic and asymptomatic patients are transmissible[6].

Due to the high transmissibility of COVID-19, public and private dental clinics play an important role in containing this potential, since these places have been defined, in analyzes by labor bodies, as the one with the greatest risk of contamination for professionals and patients. This is especially true for work in the oral cavity, since swabs of the mucosa in this area demonstrate a high viral load in infected patients[7]. Added to the fact that under normal conditions the infected patient can create a transmission area of approximately $2m^2$ (distance that must be adopted by the population in the so-called social distance) and during the production of aerosol in a dental clinic this can be extended to $6m^2$, according to ANVISA[8].

The entry pathways are the upper airways, mouth and eyes. Therefore, it is very important is important to adequately protect these areas by health teams as well as frequent hand and work environment hygiene in contact areas. Important measures to drastically stop transmission include coughing or sneezing etiquette: covering the mouth with the inner area of the elbow region, avoiding the use of the hand; make use of a professional mask for work teams and a homemade mask for the general population; decrease aerosol production in dental clinics; make necessary changes in the waiting room, in patient triage and in the form of care - that is, the entire dental process aimed at not spreading the virus and any other pathogens; isolate symptomatic people and promote social distancing[9].

These measures must be implemented in clinical settings, since the potential for cross-transmission is high, as it is an unhealthy scenario, following pre-appointment screening strategies, scheduling appointments, patient reception, setting, dressing and undressing of patients, professionals, and cleaning[8].

The droplets and aerosols that are able to remain in suspension for a long period of time depending on their mass and volume, which can vary between 0.001 and 10,000 μm. Droplets have particles larger than 100 μm and due to gravitational force, they settle faster than aerosols. During this process of remaining suspended in the air until deposited on environmental surfaces or entering the respiratory tract of another individual, it is believed that the use of new physical barriers during the use of rotary instruments should be implemented, since the current associated to personal protective equipment (PPE) have not been sufficient to prevent viral contamination during dental care[8,9].

It is justified to carry out this research due to the fact that most dental procedures produce aerosols and droplets (high rotation, triple syringe, ultrasound, among others) that may be contaminated with viruses. Thus, the aerial propagation of droplets and aerosols is of great importance in dental clinics and hospitals, because it is difficult to avoid their production mixed with the patient's saliva and even blood during clinical dental practice[10,11].

It is also worth mentioning that in addition

to the coughing and breathing of the infected patient, dental devices such as the handpiece use high-speed air to drive the turbine and work with water. When these devices work in the patient's oral cavity, a large amount of aerosol and droplets mixed with the patient's saliva or blood are generated[12].

Guidelines for infection control during dental care are vast in the literature. Since the use of personal protective equipment (PPE) for the dental team and patient, as well as disinfection of the environment and sterilization of instruments have been mentioned in articles and manuals[1,13]. However, as COVID-19 has high infectivity, with the SARS-CoV-2 coronavirus being found in the saliva of 91.7% of those infected, with no effective treatment and vaccine for the disease, it is essential to use equipment that reduces or eliminates the infection. cross-infection of COVID-19 and other respiratory syndromes[12,14].

Everyone in the dental field is aware that there is a possibility of cross-infection due to the use of high-speed turbines and triple syringes. This risk is more pronounced when collective and simultaneous consultations are performed, with several chairs in the same environment, where patients are not protected by the same equipment that protects the dentist and are vulnerable to infection via the ocular conjunctiva and the respiratory tract mucosa. In addition, the clinical trays with the instruments to be used can be hit by splashes from other nearby treatment units. There is a need for PPE for professionals and patients, as well as the placement of dividers between equipment located in the same environment, as in university clinics and public service clinics[1,15].

Therefore, the objective of this research was to verify the effectiveness of physical and mechanical barriers in the prevention, control and management of COVID-19 during the dental care in a school clinic.

2 METHODS

Ethical Aspects

The research was carried out after the ethical opinion of approval of the Research Ethics Committee of the State University of Piauí - CEP/UESPI, with the CAAE number 38743120.7.0000.5613. This research was guided by obedience to all the ethical principles that guide research involving human beings, as provided for in Resolution No. 466/12 (CNS/MS), with the students having read and accepted the Informed Consent Form (ICF). Furthermore, only information collected strictly within the limits of the research objectives was used. The consultations took place in the same office, by a single researcher, and the other acted as an oral health assistant (OHA), having been performed by 4 hands. The researcher adopted all the biosecurity measures recommended in the manual prepared by the Federal Council of Dentistry (FCD) regarding PPE for the dental team and patients, cleaning and disinfection of the entire service environment of the office, which was separated from the other offices, by partition, so that the distance between it and the head of the patient who was treated was 2m and between the two dental chairs 4m.

Population Study

The research was carried out at in the Dental School Clinic (DSC) of the State University of Piauí (UESPI) in Parnaíba/PI, from January to June 2022, and dental students were looking for assistance. The sample size calculation was based on the target population: young people over 18 years of age, enrolled in the dentistry course totaling 120 students at UESPI. Thus, the required sample size was 24 participants. The sample was non-probabilistic, with the minimum number of considered sufficient, considering the proposed participants

analyses, the sampling error of 5%, in addition to a 90% confidence level, indicating that the probability of the error made by the research was not exceeded 5%[16].

Eligibility Criteria

Inclusion criteria were young people over 18 years of age who were studying a bachelor's degree in dentistry at any time, who sought the DSC for dental treatment in the 4 specialties: surgery, restorative dentistry, endodontics and periodontics and who wished to participate in the research. While in the exclusion criterion were students outside the established age group.

Calibration

Two researchers were previously calibrated by the professor responsible for the research, in the 4 specialties to be investigated: surgery (S), restorative dentistry (D), endodontics (E) and periodontics (P), with 36 hours of activities, divided into theoretical discussion of the variables used, codes and criteria of examination and practical discussion, simulating the different conditions and situations that the professionals would encounter during the practical work. In order to assess intra- and interexaminer diagnostic reproducibility, 10% of the total sample was double-checked by each of the examiners, with the Kappa coefficient for intra and inter-examiner agreement being 0.81 and 0.82, respectively.

Pilot Study

Before data collection, a pilot study was carried out with 3 dentistry students, who received treatment in the 4 specialties in the 3 groups: control group (CG), which adopted the CFO's current biosafety standards; with circular acrylic shield (G1) and with rectangular acrylic shield (G2), during attendance at the DSC, and did not participate in the research, to evaluate the method and verify if there would be any need to make changes in the methodology initially proposal. As a result, there was no need to change the methodology.

Data Collection

In addition to the physical barriers and PPE recommended by the FCD, two types of transparent acrylic physical shields were investigated: the first placed attached to the triple syringe, rotatory instruments and sucker, being a circular device 10cm in diameter and 1mm in thickness, with a central hole for the syringe, rotatory instruments and sucker to fit in (figure 1).

The second screen was a rectangular acrylic 60cm X 50cm, and 30cm high, in the shape of a box, with two holes on the sides for the introduction of rotatory instruments, syringe and sucker, which was supported on the back of the head and on the back of the trunk of the dental chair, used in the G2. These screens were used only during the generation of aerosols (figure 2).

Twenty-four consultations were performed in the 4 specialties under study: surgery (S), restorative dentistry (D), endodontics (E) and periodontics (P) in anterior or posterior teeth. The consultations took place in the same office of the DSC, performing 4-hand service. All dental and endodontic consultations were performed under absolute isolation.

For each specialty researched, we have 3 groups: control group (CG), which adopted the current biosafety norms of the FCD; the group with circular screen (G1); group with the rectangular bulkhead (G2). For each specialty, the researcher performed a total of 6 consultations, whose patients were chosen by lot to which group they participated, so that the distribution was equitable between the groups. For example, for specialty C, 6 patients were seen: 2 for CG, 2 for G1 and 2 for G2. Such criteria were adopted for the 4 specialties.

In the dental chairs there are plastic containers for the water used in the cooling of the high-speed turbine and in the triple syringe. These containers hold 700ml of water, in which 10ml of red colored pigment (aniline) were diluted for each clinical care[1].

For each service, white crepe paper was used to cover the entire floor, partition, chairs, equipment, reflectors, armrests, rotatory instruments, triple syringes, motorized instruments for endodontic and periodontal access in order to facilitate the visualization of colored splashes. The researchers and patients were dressed in a white TNT cap, shoe and long-sleeved apron for the same purpose. A surgical mask was placed over the researchers PFF2 masks, plus goggles and a transparent acrylic face shield.

After each dental appointment, the research advisor teacher checked, with the naked eye, the presence of colored stains in all parts that were covered by crepe paper and in the PPE of the researchers and patients, circling those furthest from their point of origin with a red pen. Proceeding to verify the maximum reach of the pigmented splashes, considering as a point of origin a mark referring to the patient's mouth, made on the headrest of the chair, with the water in the reservoir the same color as the splash that was being evaluated. The measurement was performed with a measuring tape, by the teacher, supervised by the researchers. The measurements were confirmed twice. Digital photographs were taken to record the contamination observed by the generation of aerosols, after each clinical visit[1].

Figure 1. Circular acrylic shield used in G1

Figure 2. Acrylic box-shaped bulkhead, with side holes for penetration by operators' hands

Data analysis

Means and dispersion values were obtained and the Chi-square association test was applied, with a statistical significance level of 5%, to compare the results between the groups. The Kruskal-Wallis test was applied in order to detect possible differences in contamination in the surveyed areas.

Data were previously organized in the Excel program (Microsoft, Redmond, WA, USA) for initial descriptive analysis. Then, statistical analyzes were performed using the

SPSS Statistics 25.0 software (IBM, Armonk, NY, USA) using the significance parameter at 5%.

To analyze whether there was a qualitative association between the spatter distances, in the applied dental areas, groups of the present study and analyzed barrier mechanisms, Pearson's Chi-Square tests were applied.

3 RESULTS

The performance of 24 dental appointments was distributed so that there were 6 for each specialty: periodontics, restorative dentistry, surgery and endodontics, according to the needs of patients at the DSC, with 10 male patients and 14 female patients, who were attending the dentistry course at UESPI, distributed between the first and tenth period.

Aerosol stains were found around office equipment, as well as on PPE and close to the patient. The maximum distance found from aerosol splashes to the naked eye was 1.43m during prophylaxis procedures in patients with periodontal problems. Most of the splashes were found on the PPE used by professionals, especially on gloves, in the professionals' wrist region; gown and neck on the patient.

Based on figures 3, 4 and 5, the proliferation of aerosols with the use of circular screens and/or only PPE by professionals was higher when related to treatments performed with the acrylic box, which showed greater efficiency for the barrier of these particles. The acrylic box, due to its conformation and location, was able to contain the stains from aerosols in only one location.

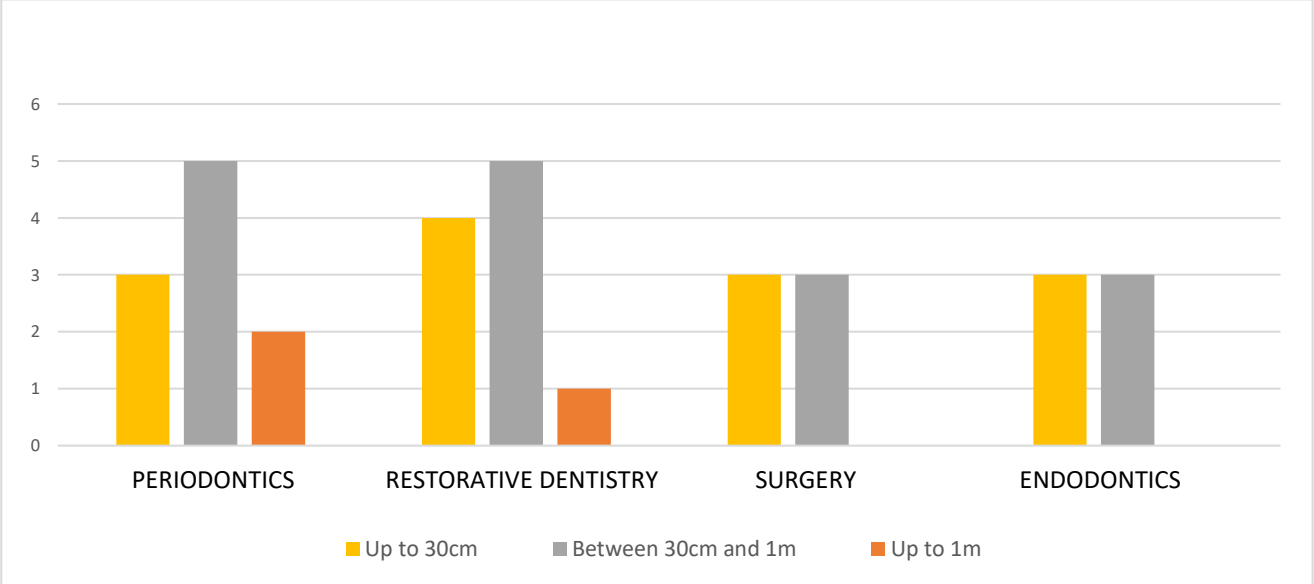

Figure 3. Distances of spots found by specialty with the use of PPE recommended by the FCD in the in the dental appointments

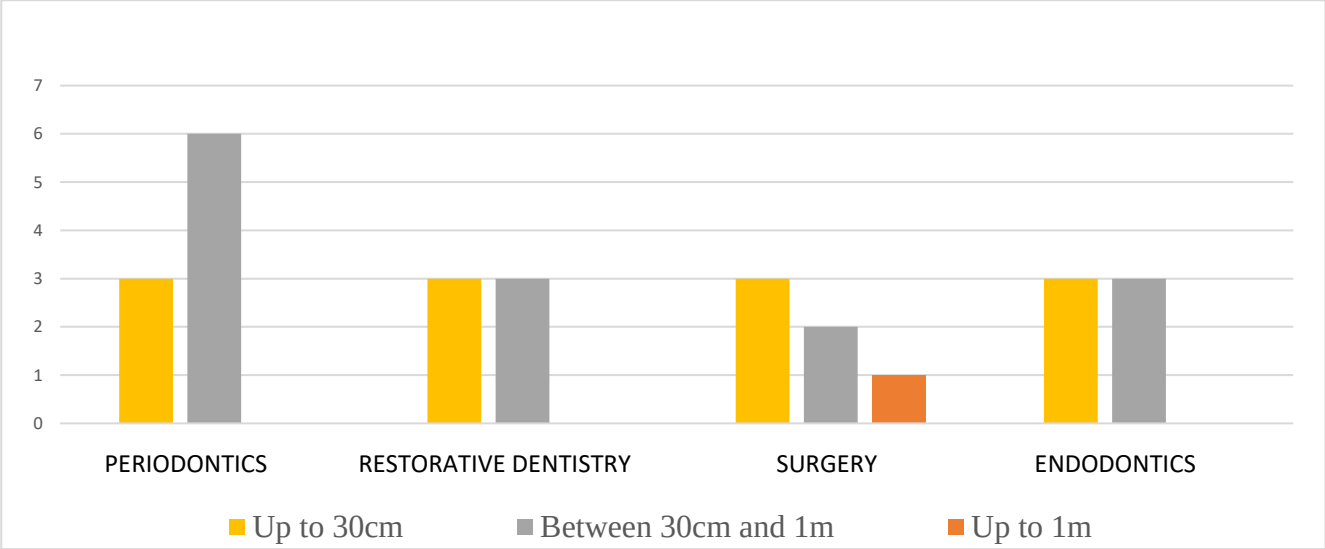

Figure 4. Distances of stains found by area of operation with the use of PPE recommended by the FCD and circular screen on rotatory instruments, triple syringe and sucker in the dental appointments

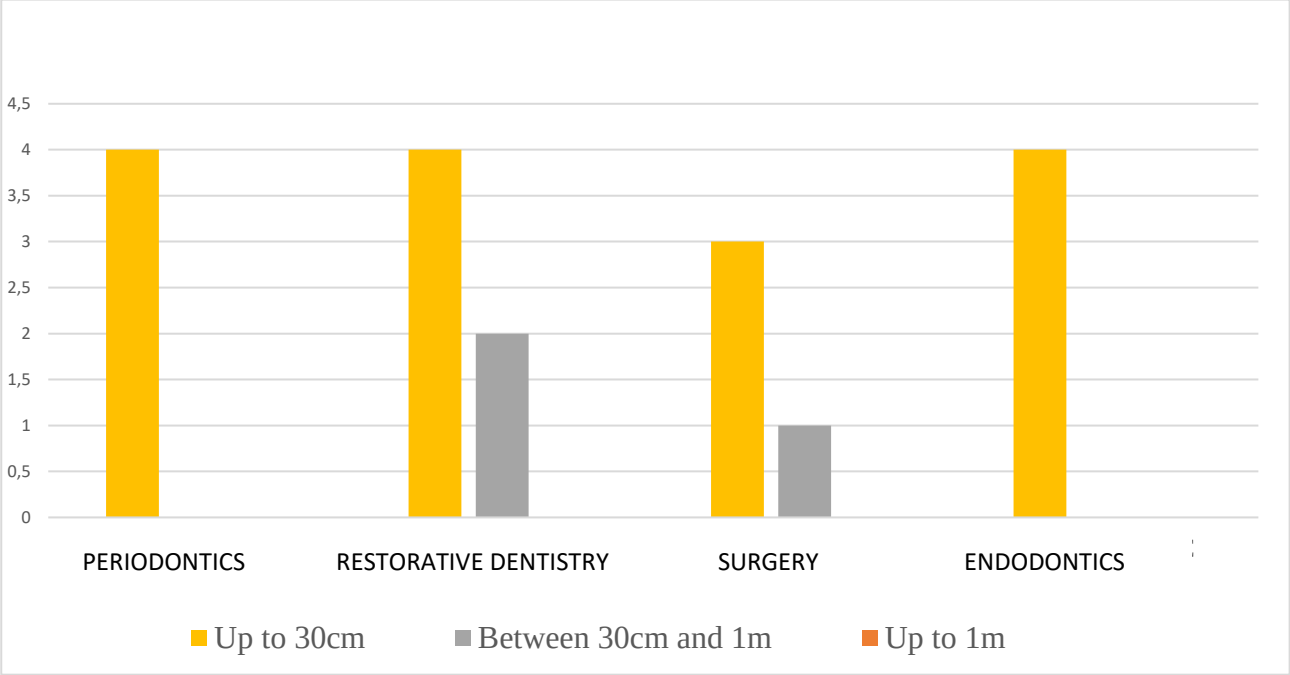

Figure 5. Distances of spots found by area of operation with the use of PPE recommended by the FCD and rectangular screen (acrylic box) in the dental appointments

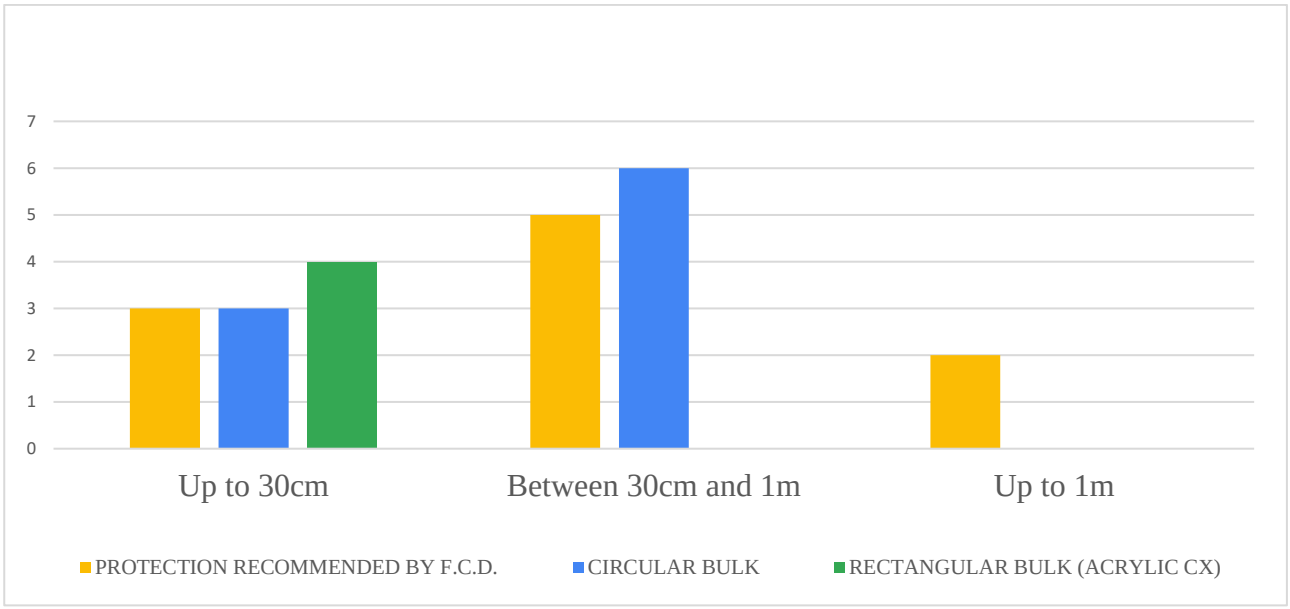

Figure 6. Distribution of dispersion particles, in the specialty of periodontics and forms of protection

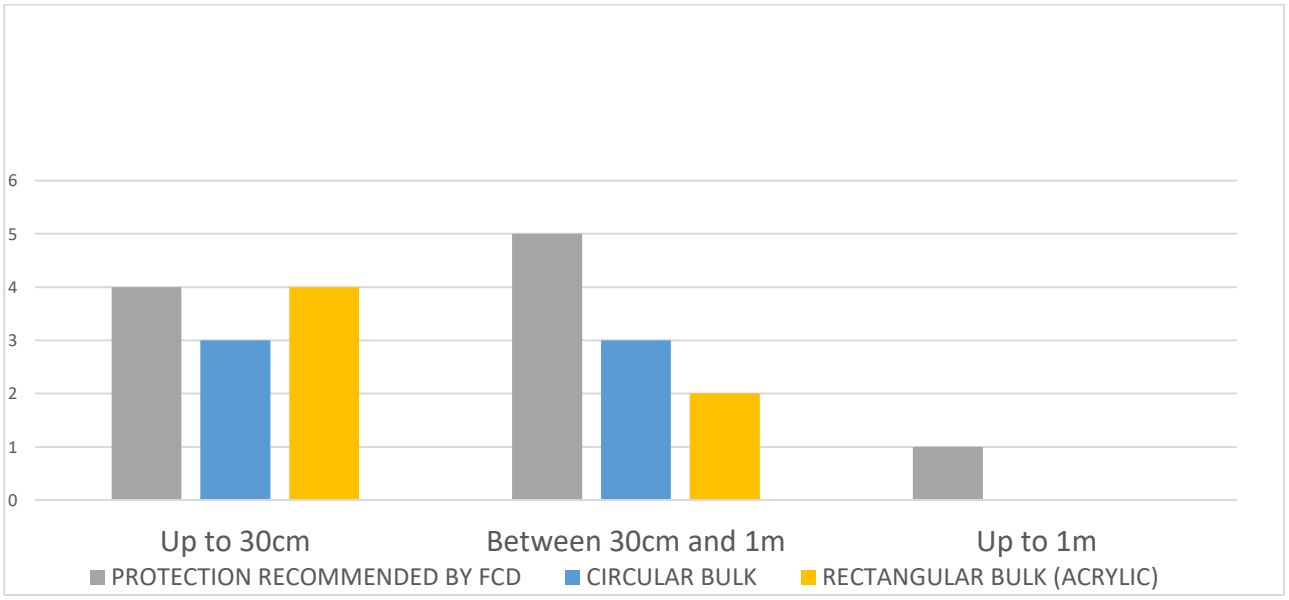

Figure 7. Distribution of dispersion particles, in the specialty of restorative dentistry and forms of protection

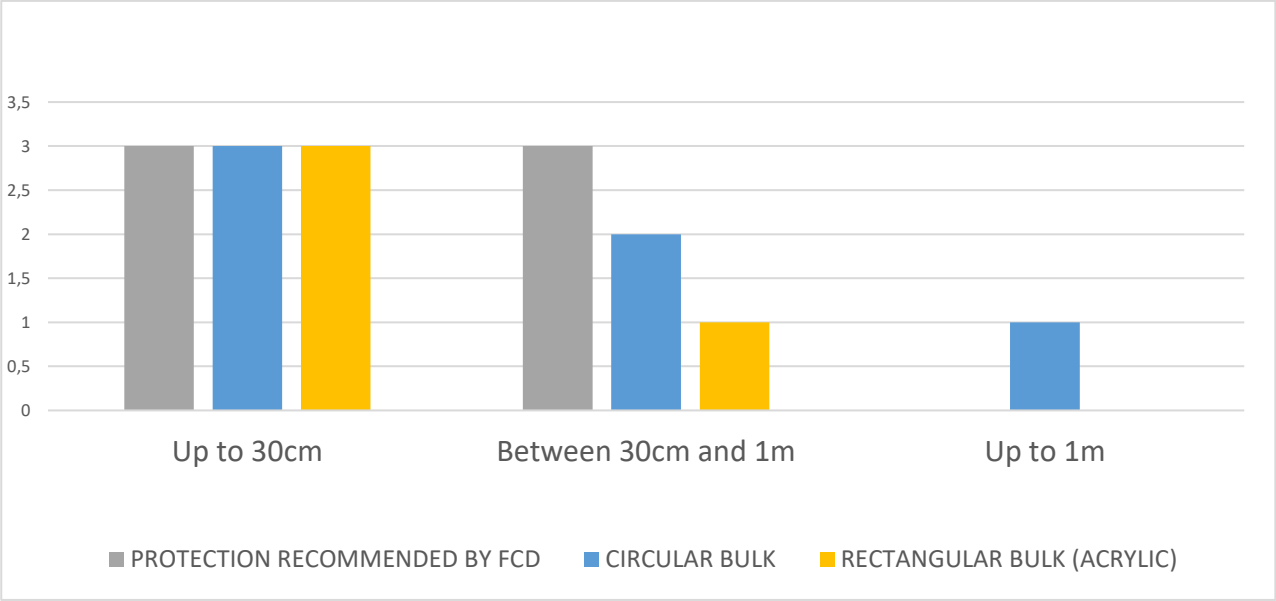

Figure 8. Distribution of dispersion particles, in the specialty of surgery and forms of protection

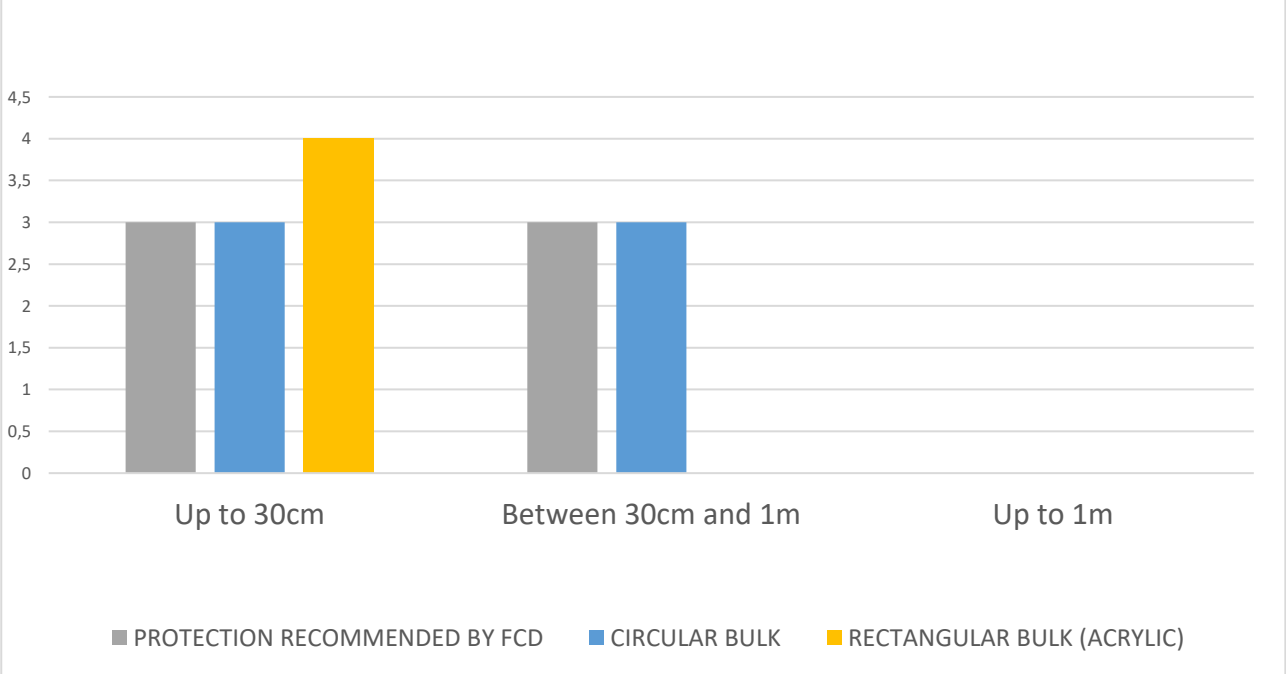

Figure 9. Distribution of dispersion particles, in the specialty of endodontics and forms of protection

The dispersion of aerosol droplets was higher in procedures using PPE recommended by the FCD in Periodontics and Restorative dentistry specialties, as shown in Figures 6 and 7, while the lowest amount was found in Surgery and Endodontics procedures performed using the acrylic box, as shown in figures 8 and 9. A descriptive analysis of the groups evaluated in the 4 specialties was shown in table 1.

The results showed that there was no statistically significant correlation between the variables: distance (< 30cm, 30cm < x < 1m and > 1m) and barrier mechanisms (groups CG,

G1 and G2), as the data resulted in a p- value > 0.05. In addition, the observed and expected values are close (table 2).

To assess whether there was a statistically significant difference between the study groups (groups CG, G1 and G2) in relation to the quantitative variance of the distance (cm) of splashes within and between the specialties, Kruskal-Wallis tests were applied for the analysis of the variables (tables 3 and 4).

The Kruskal-Wallis tests did not show a statistically significant difference between the groups within the specialties (p-value > 0.05), thus, it was not necessary to compare the pairs.

The Kruskal-Wallis tests did not show a statistically significant difference between the groups within the specialties (p-value > 0.05); thus, it was not necessary to compare the pairs.

Table 1. Initial descriptive analysis of data in relation to spatter distance (cm) within groups in each dental specialty

Dental specialties	Study groups	Descriptive Analysis		
		Average	Median	Standard deviation
Periodontics	CG	63.80	55.50	39.27
	G1	42.78	40.00	17.47
	G2	24.00	23.50	4.97
Restorative dentistry	CG	48.70	40.00	28.81
	G1	34.17	30.50	11.44
	G2	37.00	30.00	21.86
Surgery	CG	44.83	36.00	26.57
	G1	45.67	33.50	36.39
	G2	29.25	27.50	11.00
Endodontics	CG	39.33	33.50	20.65
	G1	44.83	30.50	27.56
	G2	26.25	26.50	4.35

Note: CG (group control); G1 (group with circular bulkhead); G2 (group with rectangular bulkhead).

Table 2. Pearson's Chi-Square Tests for the quantitative variables in the specialties analyzed

Dental specialties	Pearson's chi-square (χ^2, df, p- value)
Periodontics	$\chi^2 = 5.14$ df= 4 p-valor= 0.57
Restorative dentistry	$\chi^2 = 1.63$ df= 4 p-valor= 0.80
Surgery	$\chi^2 = 2,57$ df = 4 p-valor = 0.63
Endodontics	$\chi^2 = 0.42$ df=2 p-valor= 0.81

Note: χ^2- Chi-square test; df: degrees of freedom.

Table 3. Kruskal-Wallis test applied in each dental specialty in relation to possible differences between the study groups (GC, G1 and G2)

Dental specialties	Kruskal-Wallis (p-value)
Periodontics	0.05 n.s
Restorative dentistry	0.75 n.s
Surgery	0.53 n.s
Endodontics	0.40 n.s

Table 4. Kruskal-Wallis test applied within each study group (CG, G1 and G2) in relation to possible differences between dental specialties

Groups	Kruskal-Wallis (p-value)
CG	0.55 n.s
G1	0.76 n.s
G2	0.56 n.s

4 DISCUSSION

In a spread of particles, whatever the size, there are a number of microorganisms that can be pathogens and developers of cross-infection. Our study was based on the verification of the dispersion of splashes produced in the mouth, due to the fluidity of aerosols during dental treatment[17-19].

In dental procedures, the dental drill and triple syringe generate droplets and aerosols that disperse in all directions at distances that can exceed 2.0m from their place of origin, measured from the perimeter of the oral cavity, which was corroborated by our results in figures 1 and 2, where we observed periodontics as one of the areas in which there was more dispersion. This fact was probably due to the use of rotatory instruments in the invasive and prophylactic clinical procedures[20-23].

The splashes were found in a variety of directions with a maximum distance of 1.43m, having a smaller range than the study by other authors[14], which marked a maximum distance of 1.82m. The smaller spectrum of splashes in our work, in relation to the others, is due to the fact that the barriers used were effective.

Although the use of PPE is effective to contain the scope of the splashes, it is worrying, since the clinical trays containing sterilized material and instruments, as well as assistants and dentists were located within the scope of the splashes[12]. Therefore, the possibility of cross-contamination occurring during the execution of care is quite clear. The splashes that were deposited in all consultations, except those that were with the help of the acrylic box, had a greater concentration in the region of the face of the dentist and assistant, in agreement with what was found in the literature[16].

Cross-infections in dentistry have a variety of entry ports into our body, including proliferation through the entry of splashes through the eyeball1[7,24]. The large amplitude of splashes on the face, not to mention the minimization of accidents with sharps in dentistry, corroborates the importance of the use of face shield and goggles by the dentist and health assistant during the dental procedures.

In all dental appointments, numerous splashes were found on the sleeves of the aprons

used by the researchers and in the regions of the patient's face, neck and chest (especially in the patients, in whose treatments the acrylic box was used), confirming the need for the use of aprons by the patients. individuals involved.

Research in the literature is scarce regarding the spread of droplets during dental care, especially in the face region. In times of Covid-19, this reinforces the need for individual protection by the individuals involved in the treatment, especially face shield, goggles, mask (N95 or PFF2), to avoid possible contamination and injuries. This reinforces the need to implement mandatory universal precautionary measures, with effective infection control. The use of antimicrobial solutions is indicated to reduce the load, as well as its propagation[12,25-27].

The study in question took as an alternative measure project to increase the effectiveness of biosafety barriers, however the acrylic box was able to reduce the spread of aerosols, concentrating them on the inside (G2). As for the CG and G1 groups, there was a similarity in the spatter distances, since the particles do not have a dissemination pattern and are only stopped when there is an effectiveness in the biosafety barriers.

We hope to help dental professionals to proceed with their clinical routine safely, as well as to reduce the possibility of cross-infections to patients, we emphasize the importance of using the biosecurity measures recommended by international and national authorities, including the updates that are being constantly produced during the pandemic.

5 CONCLUSION

There was dissemination of aerosol droplets in all dental appointments in the 4 specialties studied. Although the PPE's proposed by the FCD are effective as a physical barrier to reduce cross-infection and the spread of droplets and aerosols, as well as a preventive measure against COVID-19 during dental care, the professional can use other devices that demonstrate effectiveness, such as the circular screens and the acrylic box, during the dental procedures.

RESUMO

Prevenção, controle e manejo da COVID-19 durante o atendimento odontológico em clínica escola

Este estudo investigou a eficácia de barreiras físicas e mecânicas na prevenção, controle e manejo da COVID-19 durante o atendimento odontológico. Neste estudo transversal, dois alunos pesquisadores do oitavo período do curso de Odontologia realizaram 24 atendimentos de janeiro a junho de 2022, nas 4 especialidades em estudo: cirurgia (C), dentística restauradora (D), endodontia (E) e periodontia (P). Para cada especialidade pesquisada houve 3 grupos: controle (GC), que adotou as normas vigentes de biossegurança do Conselho Federal de Odontologia (CFO); com anteparo circular (G1) e com o anteparo retangular (G2). Para cada especialidade, o pesquisador realizou 6 atendimentos, cujos pacientes foram escolhidos por sorteio para qual grupo participariam, de modo que a distribuição fosse equitativa entre os grupos. As manchas de aerossóis foram encontradas em torno dos equipamentos do consultório, bem como em equipamentos de proteção individual dos profissionais e próximas ao paciente. A máxima distância encontrada de respingos de aerossóis a olho nu foi de 1,43m durante procedimentos de profilaxia em acadêmicos com problemas periodontais foi encontrada no GC. Em todos os grupos, a maioria dos respingos foram encontrados sobre os equipamentos de proteção individual (EPI) utilizados pelos profissionais, principalmente nas luvas, na região de punho dos profissionais; no paciente, no avental e pescoço. Não houve diferença estatisticamente significativa entre os grupos dentro das especialidades (p-valor > 0,05), prescindindo a comparação entre os pares. Concluiu-se que houve disseminação de

gotículas de aerossóis em todos os atendimentos odontológicos nas 4 especialidades estudadas. Apesar de os EPI propostos pelo CFO serem eficazes como barreira física para diminuição de infecção cruzada e da propagação de gotículas e aerossóis, bem como medida preventiva contra a COVID-19 durante o atendimento odontológico, o profissional poderá lançar mão de outros aparatos que demonstrem eficácia, como por exemplo, os anteparos circulares e a caixa acrílica, durante os procedimentos odontológicos.

Descritores: Pandemia. Odontologia. Prevenção.

REFERENCES

1. Holshue ML, Debolt C, Lindquist S, Lofy KH, Wiesman J, Bruce H et al. First case of 2019 novel coronavirus in the United States. N Engl J Med. 2020; 382(10):929-36.
2. Del Rio C, Malani PN. 2019 novel coronavirus-important information for clinicians. JAMA. 2020; 5(1):1039-40.
3. Conselho Federal de Odontologia (CFO). Manual de boas práticas em biossegurança para ambientes odontológicos. [Cited Apr. 6, 2020]. Available from: http://website.cfo.org.br/wp-content/uploads/2020/04/cfo-lanc%CC%A7a-Manual-de-Boas-Pra%CC%81ticas-em-Biosseguranc%CC%A7a-para-Ambientes-Odontologicos.pdf.
4. Gorbalenya, AE, Baker SC, Baric RS, de Groot RJ, Drosten C, Gulyaeva AA et al. Severe acute respiratory syndrome-related coronavirus: the species and its viruses - A statement of the Coronavirus Study Group. Nat Microbiol. 2020; 5(4):536-44.
5. Thompson RN, Cunniffe NJ. The probability of detection of SARS-CoV-2 in saliva. Stat Methods Med Res. 2020; 29(4):1049-50.
6. Williams E, Bond K, Zhang B, Putland M, Williamson DA. Saliva as a noninvasive specimen for detection of SARS-CoV-2. J Clin Microbiol. 2020; 58(8): e00776-20.
7. 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.
8. Rothe C. Transmission of 2019-nCoV infection from an asymptomatic contact in germany. N Engl J Med. 2020; 382(10):970-71.
9. Kampf G, Todt D, Pfaender S, Steinmann E. Persistence of coronaviruses on inanimate surfaces and their inactivation with biocidal agents. J Hosp Infect. 2020; 104(3):246-51.
10. Muniz IAF, Van der Linden L, Santos ME, Rodrigues RCS, Souza JR, Oliveira RAS et al. SARS-CoV-2 and saliva as a diagnostic tool: a real possibility. Pesqui Bras Odontopediatria Clín Integr. 2020; 20(1):11.
11. Xu R, Cui B, Duan X, Zhang P, Zhou X, Yuan Q. Saliva: potential diagnostic value and transmission of 2019-nCoV. Int J Oral Sci. 2020; 12(11):1-6.
12. Otter JA, Donskey C, Yezli S, Douthwaite S, Goldenberg SD, Weber DJ. Transmission of SARS and MERS coronaviruses and influenza virus in healthcare settings: the possible role of dry surface contamination. J Hosp Infect. 2015; 92(3):235-50.
13. Silveira MGSS, Fernandez MS, Tillmann TFF, Danigno JF, Echeverria MS, Silva AER. Changes in dental practice in times of COVID-19: review and recommendations for dental health care. Rev Gaúch Odontol. 2021; 69(8):e2021001.
14. Discacciati JAC, Sander HH, Castilho LS, Resende VLS. Verificação da dispersão de respingos durante o trabalho do cirurgião-dentista. Rev PanAm Salud Publica. 1998; 3(2):84-7.
15. Li L, Huang T, Wang Y, Wang Z, Liang Y, Huang T et al. 2019 novel coronavirus patients clinical characteristics, discharge rate, and fatality rate of meta-analysis. J Med

Virol. 2020; 92(6):577-83.
16. Fontelles MJ, Simões MG, Almeida JC, Fontelles RGS. Metodologia da pesquisa: diretrizes para o cálculo do tamanho da amostra. Rev Paraense Med. 2010; 24(2):57-64.
17. Kohn WG, Harte JA, Malvitz DM, Collins AS, Cleveland JL, Eklund KJ. Centers for Disease Control and Prevention (CDC). Guidelines for infection control in dental health-care settings. MMWR Recomm Rep. 2003; 19(52):1-61.
18. Iyer P, Aziz K, Ojcius DM. Impact of COVID-19 on dental education in the United States. J Dent Educ. 2020; 84(6):718-22.
19. Medeiros MS, Santos HLF, Barreto JO, Freire JCP, Dias-Ribeiro E. COVID-19 pandemic impacts to Dentistry. Rev Gaúch Odontol. 2020; 68(21): e20200021.
20. Meng L, Hua F, Bian Z. Coronavirus Disease 2019 (COVID-19): emerging and future challenges for dental and oral medicine. J Deny Res. 2020; 99(5):481-87.
21. Raghunath N, Meenakshi S, Sreeshyla H, Priyanka N. Aerosols in dental practice - a neglected infectious vector. BMRJ. 2016; 14(2):1-8.
22. Montalli VAM, Garcez AS, Montalli GAM, França FMG, Suzuki SS, Mian LMT et al. Individual biosafety barrier in dentistry: an alternative in times of covid-19. Preliminary study. Rev Gaúch Odontol. 2020; 68(17):e20200088.
23. Ahmed A, Jouhar R, Ahmed N, Adnan S, Aftab M, Zafar M et al. Fear and practice modifications among dentists to combat ovel coronavirus disease (COVID-19) outbreak. Int J Environ Res Public Health. 2020; 17(8):2821.
24. Lu CW, Liu XF, Jia Z. 2019-nCoV transmission through the ocular surface must not be ignored. Lancet. 2020; 395(10224):e39.
25. Doremalen N, Morris DH, Holbrook MG, Gamble A, Williamson BN, Tamin A et al. Aerosol and surface stability of SARS-CoV-2 as compared with SARS-CoV-1. N Engl J Med. 2020; 382(16):1564-7.
26. Nesi MAM, Filho RSB, Lima EG, Medeiros AMC. Contaminação de jalecos utilizados por estudantes de odontologia. Saúde Rev. 2006; 8(20):47-54.
27. To KKW, Tsang OTY, Yip CCY, Chan KH, Wu TC, Chan JMC et al. Consistent detection of 2019 novel coronavirus in saliva. Clin Infect Dis. 2020; 71(15):841-3.

Correspondence to:
Ana de Lourdes Sá de Lira
e-mail: anadelourdessl@hotmail.com
Universidade Estadual do Piauí
Faculdade de Odontologia
Rua Senador Joaquim Pires, 2076 Iningá
64049-590 Teresina/PI Brazil