SCT Proceedings in Interdisciplinary Insights and Innovations. 2025; 3:399
doi: 10.56294/piii2025399

Category: Applied Research in Health and Medicine

REVIEW

Biosecurity protocols in dentistry in the face of the COVID-19 pandemic

Protocolos de bioseguridad en odontología frente a la pandemia de COVID-19

Belene Mattos[1]

[1] Universidad Abierta Interamericana, Departamento de Odontología. Buenos Aires, Argentina.

Cite as: Mattos B. Biosecurity protocols in dentistry in the face of the COVID-19 pandemic. SCT Proceedings in Interdisciplinary Insights and Innovations. 2025 Jan. 1; 3:399. DOI: https://doi.org/10.56294/piii2025399

Submitted: 12-09-2025 **Reviewed:** 27-11-2024 **Accepted:** 03-01-2025 **Published:** 05-01-2025

Editor: Emanuel Maldonado

ABSTRACT

Introduction: In December 2019, pneumonia cases were identified in Wuhan, China, subsequently attributed to the SARS-CoV-2 virus causing COVID-19. Its rapid spread led the World Health Organization to declare it an international health emergency in January 2020. This virus belongs to the Coronaviridae family and has generated unique challenges due to its high transmissibility and infective capacity.
Development: SARS-CoV-2 was transmitted mainly by respiratory droplets, contact with contaminated surfaces and aerosols generated during medical procedures, including dental procedures. In dentistry, it was observed that the virus binds to ACE-2 receptors present in the oral cavity, which increased the relevance of implementing strict biosafety protocols. These measures included the use of personal protective equipment, such as N95 masks, face shields and gloves, along with chemical barriers such as specific disinfectants. In addition, mouth rinses with 1% hydrogen peroxide and 0.2% povidone demonstrated effectiveness in reducing viral load.
Conclusions: The pandemic underscored the need to strengthen biosecurity protocols in dentistry. The measures implemented, together with staff and patient awareness, allowed mitigating risks and ensuring continuity of care. These practices not only protect against SARS-CoV-2, but also prepare the field.

Keywords: COVID-19; SARS-CoV-2; biosecurity; dentistry; transmission.

RESUMEN

Introducción: En diciembre de 2019, se identificaron casos de neumonía en Wuhan, China, atribuidos posteriormente al virus SARS-CoV-2, causante de la enfermedad COVID-19. Su rápida propagación llevó a la Organización Mundial de la Salud a declararlo una emergencia sanitaria internacional en enero de 2020. Este virus pertenece a la familia Coronaviridae y ha generado desafíos únicos debido a su alta transmisibilidad y capacidad infectiva. Desarrollo: El SARS-CoV-2 se transmitió principalmente por gotitas respiratorias, contacto con superficies contaminadas y aerosoles generados durante procedimientos médicos, incluyendo los odontológicos. En odontología, se observó que el virus se

adhiere a los receptores ACE-2 presentes en la cavidad oral, lo que incrementó la relevancia de implementar estrictos protocolos de bioseguridad. Estas medidas incluyeron el uso de equipos de protección personal, como mascarillas N95, pantallas faciales y guantes, junto con barreras químicas como desinfectantes específicos. Además, los enjuagues bucales con peróxido de hidrógeno al 1% y povidona al 0.2% demostraron efectividad para reducir la carga viral.
Conclusiones: La pandemia subrayó la necesidad de fortalecer los protocolos de bioseguridad en odontología. Las medidas implementadas, junto con la concienciación del personal y los pacientes, permitieron mitigar riesgos y garantizar la continuidad de la atención. Estas prácticas no solo protegen contra el SARS-CoV-2, sino que preparan el campo odontológico para futuras emergencias sanitarias.

Palabras clave: COVID-19; SARS-CoV-2; bioseguridad; odontología; transmisión.

INTRODUCTION

In December 2019, fatal cases of pneumonia emerged in the city of Wuhan, China, and less than a month more than 40 people were reported to be infected; later in, countries on the same continent, such as Thailand and Japan, also reported their first cases. In January 2020, the World Health Organization (WHO) declared a public health emergency of international concern due to the rapid spread of the disease, and following genetic analysis, it was determined that the causative agent was a previously unknown coronavirus.

The disease was named coronavirus disease 2019 (COVID-19), and the virus was initially named 2019-nCoV and was later renamed severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) as we currently know it. (1)

DEVELOPMENT

Viral agent and Aspects of care in Dental Practice

The SARS-CoV-2 virus, the causative agent of COVID-19, is part of the Coronaviridae family. Although it is commonly referred to as a coronavirus, this name represents a family of viruses that includes, in addition to the one causing the current pandemic, the SARS coronavirus (SARS-CoV) that caused the SARS epidemic in 2002-2003 with a mortality rate of 10% and MERS-CoV (Middle East respiratory syndrome) which had a mortality rate of 37%. (3-4)

Some aspects identify viruses in general, and this virus in particular, that are pertinent to present because they will allow us to understand elements to consider in the management and control of dental practice, which are:

Route of transmission

It is direct and interpersonal, mainly by inhalation of respiratory droplets (Flügge droplets) and indirect by contact with contaminated surfaces (fomites). (7)

It is suspected that transmission is not limited to the respiratory tract and that ocular exposure may be a route of entry for the virus. (8) Therefore, the droplets can be deposited on the nasal, oral, and conjunctival mucosa and, from there, produce the infection.

Direct or indirect interpersonal transmission through saliva can also be a transmission route, and the presence of viral particles in the saliva of infected individuals has been reported. (8)

On the other hand, studies have shown that ACE-2 can be expressed in the epithelial cells of the oral cavity, particularly in the tongue. (9)

Although it is not confirmed, it is suggested that the airborne route through aerosols produced during medical procedures (including those generated in dental care) may be another transmission route, and fecal-oral transmission is also in doubt. (3,8)

About airborne transmission, the CDC mentions that transmission by this route is currently uncertain. However, transmission by this route from person to person over long distances is unlikely. For this reason, in the case of dental care, where the distance is minimal, attention to this route is significant. (10)

On the other hand, special care must be taken because aerosols and droplets containing infectious agents are generated in many dental procedures. These can affect health professionals but also spread to surfaces and the clinic environment. (10)

Transmission rate

The transmission rate, which defines the number of people an infected host can infect, is estimated to be between 2.24 and 3.58, although the WHO estimates it to be between 1.4 and 2.5. For comparison purposes, seasonal flu is around 1.1 and 2.3 (depending on the region and immunization). This higher rate may be due to a more extended prodromal period, which increases the period during which the infected host can spread the disease. (1)

On the other hand, transmission could occur through contact with asymptomatic patients. (11)

Infective capacity

This represents one of the most significant challenges of SARS-CoV-2, as much of the epidemiological problem is related to its high infectivity. SARS-CoV-2 has been shown to bind at least 10 times more firmly than SARS-CoV. (12)

The spike protein contains a site that recognizes and is activated by furin, an enzyme in host cells in various organs such as the liver, lungs, and small intestine. This means that the virus can attack several organs simultaneously. (12)

Viral load

Certain studies have shown that the viral load of SARS-CoV-2 peaks in the first week of the onset of the disease (before day 6) and that severe cases have a more extended period of virus elimination. It should be borne in mind that a higher viral load implies a greater possibility of contagion; this also represents a challenge since this greater capacity for contagion would occur when the patient begins to have the first symptoms and/or has not been diagnosed. (11,13)

Survival time

Finally, regarding survival time, current evidence suggests that once droplets are deposited on surfaces, they can remain viable for hours to days, depending on the material, with increased survival in cold and dry environments. (1-2)

Biosecurity in dental practice

Biosecurity is the set of principles, standards, protocols, and practices implemented to avoid the risk to health and the environment that comes from exposure to physical, chemical, and biological agents. It is based on the principles of universality, the use of barriers, means of eliminating contaminated material, and risk assessment (14).

Before the existence and development of the COVID-19 pandemic, biosafety protocols were already being used in dental practice due to the high risk of exposure through the oral cavity. However, the high viral load of SARS-CoV-2 justified the need for the whole world to ensure physical protection and hygiene measures to prevent the spread. These measures would involve re-education and awareness raising not only for professionals in charge of dental care but also for healthcare personnel in general and for patients themselves in particular. (14)

In this research, we want to mention the most important procedures that accompany and ensure daily dental practice, which, when applied together, can reduce the risk of exposure.

Physical barriers

These constitute the most effective form of prevention, protecting against any splashes or spills of chemical, biological, or radioactive material and avoiding any contamination from us toward the patient or towards the procedures being carried out; in this way, care is mutual. (16)

Personal protective equipment

It is also known by the acronym EPP for Equipo de Protección Personal (Personal Protective Equipment) or PPE for its acronym in English. The use of biosafety elements similar to the surgical ward is mandatory to reduce the risk of contagion, face shields, and masks due to the risk of our profession in the exposure/transmission category. (15)

Procedures that generate aerosols and, therefore, expose personnel to respiratory pathogens require the use of PPE (respiratory mask and eye protection or face shields) regardless of whether there are symptoms of respiratory infection. (17)

Current protocols recommend using an FFP2 or N95 mask, cap, gloves, eye protection or face shield, disposable waterproof gown, and shoe covers. (17)

Some protocols mention that double gloves for routine procedures can only benefit procedures with a risk of puncture, such as surgery. (17)

Although certain protocols do not currently recommend a cap and shoe covers for COVID-19 patients, routine care is recommended when there is a high level of risk. The continued use of shoe covers/caps may benefit all processes that generate aerosols. (18)

Respiratory Masks/Face Masks

Surgical masks cannot be used in procedures involving the generation of aerosols, which is why respiratory or self-filtering masks (FFP2 or N95) should be used. (16,17)

FFP3 masks with a higher filtering capacity (98%) (18) should preferably not have an exhalation valve, and if they do, it is recommended that they wear a surgical mask over the top. (16,17)

Respiratory masks (such as N95) are used when caring for patients with respiratory infections transmitted by airborne particles. (17), i.e., the use of respiratory masks is recommended for any respiratory infection and is, therefore, no exception in the case of COVID-19 as it is a disease of this type. (18)

With respiratory masks, the facial seal should be checked each time they are used to minimize air leakage. As this may differ depending on the mask, check the manufacturer's recommendations. (17) The test consists of a positive closure test, which means that when exhaling, no air should be felt, and a negative closure test, in which when inhaling, no air should be felt, and the mask should be close to the face. (18)

To put it on, hold it in the palm and place it first on the chin. The upper strap should be above the ear, and the lower one should be at neck level; the two straps should not cross. (18)

The ECDC (European Centre for Disease Prevention and Control) 2014 mentioned that respiratory masks are not always certified against splashes, particularly those with an exhalation valve. To get around this situation, it suggested completing the fitting of a surgical mask over the respiratory mask. (18)

Both surgical masks and respirators are discarded with each patient. Contamination of the respirator surface can be avoided by placing a surgical mask or face shield. Given the shortage of both masks during the pandemic, sterilization methods have been proposed, but the results are inconclusive. (18)

Cap

Used to prevent contact of the hair of the professional and assistant with the patient, the instruments, or splashes of contaminated material. It should be made of sterilizable or disposable fabric and disposable and waterproof material, completely covering the entire head to collect and cover all the hair. It should ONLY be used during patient care. (18)

https://doi.org/10.56294/piii2025399

Gloves

The primary function of gloves is to isolate the skin, reduce the risk of contamination with fluids on the hands, and protect the professional/assistants in dental care. They should be made of latex or vinyl for single use, and ONLY in surgeries is it essential to use sterile gloves. They should be tight-fitting to facilitate the different procedures. In addition, they should be correctly positioned, covering the hand entirely up to the wrists and above the cuff of the sleeve of the overall to ensure adequate protection. (18)

Chemical barriers

These barriers are associated with procedures and substances designed to reduce or eliminate infectious agents and contaminants, focusing on the antisepsis of the skin through the disinfection of instruments and the environment. (19)

For Antisepsis / Mouthwashes for the oral cavity

Antiseptic rinses prior to dental care favor the reduction of the virus in the oral cavity; chlorhexidine, although one of the most widely used, would not be the most effective in SARS-CoV2. According to the American Dental Association, hydrogen peroxide at a dilution of 1% is recommended, and povidone at 0.2%, which is more effective in reducing the salivary viral load and has a low possibility of secondary complications (20).

Disinfection of environments and instruments

Although SARS-CoV-2 can remain on different surfaces for a long time, as it is an enveloped virus, it should be destroyed even by low-level disinfectants. Alcohol or alcohol-based products are effective against enveloped viruses as they break down the protective lipids. Quaternary ammonium products also work because they attack protein and lipid structures. Bleach and other powerful oxidants quickly break down the virus. (20)

Cleaning surfaces is essential to disinfection, as organic matter can inactivate many disinfectants. Removing viruses like the one that causes COVID-19 requires thorough cleaning followed by disinfection.

The standard recommendations for cleaning surfaces are to use sodium hypochlorite between 1000 ppm (0.1%) and 5000 ppm (0.5%) on worktops or the floor if it is very dirty or contaminated with blood or in critical areas or areas with stains from organic matter. 70º alcohol if the surface does not allow the use of hypochlorite.

Heat Sterilization

Most viruses are inactivated at temperatures between 56 and 65ºC maintained for 1 hour as it denatures the capsid and envelope proteins. Therefore, using equipment for steam sterilization of materials stable to heat, humidity, and pressure is considered the method of first choice due to its speed, efficiency, and compatibility (AUTOCLAVE); it ensures the death of all viruses. (14)

Hand cleaning

This is considered one of the most critical measures for reducing the risk of transmission to patients. The 5 moments for manual hygiene recommended by the WHO are maintained (18):

1. Before touching a patient
2. Before clean/aseptic procedures
3. After exposure or risk of exposure to bodily fluids
4. After touching a patient
5. After touching the surroundings of a patient

Hand washing for 40 to 60 seconds with soap and water and rinsing is recommended (18)

Active Disinfectants Against Sars-Cov-2:

The active disinfectants against coronaviruses that are considered the best choices (36) for clinical situations at the moment are:

- Sodium hypochlorite at a concentration of 1000 ppm
- Ethanol at concentrations of between 70% and 90%.

For both sodium hypochlorite and ethanol, prior cleaning is essential (35)

The above chemical agents are the most commonly mentioned and used, but others, such as 0.5% hydrogen peroxide, also appear. Many studies infer that this virus behaves like other coronaviruses, such as SARS-CoV-1. (37)

Although quaternary ammonium compounds, such as benzalkonium chloride, have a dual detergent and disinfectant property and can be a suitable alternative, their action should be verified according to standards (e.g., EPA) in the clinic where the viral load on surfaces can be high. (38)

CONCLUSIONS

The COVID-19 pandemic, caused by SARS-CoV-2, has profoundly transformed biosafety protocols in various areas, including dental practice, due to its high transmission rate, infectivity, and persistence on surfaces. This virus, a member of the Coronaviridae family, has demonstrated epidemiological characteristics that highlight its greater capacity for contagion compared to other coronaviruses, such as SARS-CoV and MERS-CoV. These properties have posed significant challenges for healthcare professionals and dentists, as they face direct and indirect transmission routes, including aerosols, saliva, and contaminated surfaces.

In the dental field, procedures that generate aerosols require strict protective measures, as these significantly increase the risk of exposure. Studies indicate that SARS-CoV-2 can firmly adhere to ACE-2 receptors present in the epithelial cells of the oral cavity, reinforcing the need to implement rigorous controls in the clinical environment.

Biosecurity measures, such as the use of personal protective equipment (PPE), are crucial to minimize risks. Items such as N95 or FFP2 respirator masks, face shields, gloves, and caps have become essential. This equipment not only protects professionals and patients but also reduces the possibility of cross-contamination. In addition, establishing chemical barriers, such as using specific disinfectants and deep cleaning protocols, has become standard practice to control the viral load on surfaces and instruments.

Biosecurity in dental practice requires a comprehensive approach that considers antisepsis of the oral cavity through rinses such as 1% hydrogen peroxide and 0.2% povidone, which have shown greater effectiveness against SARS-CoV-2. On the other hand, heat sterilization methods, such as autoclaving, remain the preferred option for virus elimination in critical instruments.

To ensure compliance with these protocols, it is essential to emphasize the importance of re-education and awareness-raising among all dental personnel, including patients. Hand washing and implementing the five critical moments for hygiene recommended by the WHO are fundamental measures to prevent the transmission of the virus.

In conclusion, the COVID-19 pandemic has underlined the need to strengthen biosafety protocols in dentistry to prevent the transmission of SARS-CoV-2 and lay a solid foundation that will protect against future health emergencies. Adopting and correctly applying these measures protects the health of staff and patients and promotes the safe continuity of dental services in a high-risk environment.

REFERENCES

1. Rabi FA, Al Zoubi MS, Kasasbeh GA, Salameh DM, Al-Nasser A.D. SARS- CoV-2 y Enfermedad de Coronavirus 2019: Lo que sabemos hasta ahora. Disponible desde: [https://www.mdpi.com/2076-0817/9/3/231/htm].
2. Meng L, Hua F, Bian Z, Enfermedad de Coronavirus 2019 (COVID-19): Emergencia y futuros desafíos para la Odontologia. Marzo 2020.
3. The Internet Book of Critical Care COVID-19. Disponible en: [https://emcrit.org/wp-content/uploads/2020/03/COVID-19-EMCrit-Project3- 16.pdf].

4. CORONAVIRUS: COVID-19 Informe técnico; Marzo 2020; Disponible en: [https://www.portalfarma.com/Profesionales/campanaspf/Asesoramiento- salud-publica/infeccion-coronavirus-2019-nCoV/Documents/Informe- tecnico-Coronavirus.pdf].
5. Liébana J .Microbiología Oral. Madrid, España: McGraw-Hill. 2020.
6. Walls AC, Park Y, Tortorici MA, Wall A, McGuire AT, Veesler D, Structure, Function, and Antigenicity of the SARS-CoV-2 Spike Glycoprotein. Cell, 181(2): 2020. Disponible: [https://www.sciencedirect.com/science/article/pii/S0092867420302622].
7. Hunt R. Coronavirus, gripes y Síndrome Respiratorio Agudo Severo (SARS). Microbiológica e Inmunología On-line- Virología. Disponible en: [https://www.microbiologybook.org/Spanish-Virology/spanish-chapter25.htm].
8. Peng X, Xu X, Li Y, Chen L, Zhou X, Ren B, Transmission routes of 2019- nCov and controls in dental practice, Int J Oral Sci 2020; 12(1). Disponible en: [https://www.researchgate.net/publication/339650518_Transmission_routes _of_2019-nCoV_and_controls_in_dental_practice].
9. Xu H, Zhong L, Deng J, Peng J, Dan H, Zeng C, Li T, Chen Q. High expression of ACE2 receptor of 2019-nCoV on the epithelial cells of oral mucosa. Int J Oral Sci 2020; 12(1). Disponible en: [https://www.nature.com/articles/s41368-020-0074-x].
10. Estados Unidos de Norteamérica. CDC - Interim Infection Prevention and Control Recommendations for Patients with Suspected or Confirmed Coronavirus Disease 2019 (COVID-19) in Healthcare Settings. Disponible en: [https://www.cdc.gov/coronavirus/2019-ncov/hcp/infection-control recommendations.html?CDC_AA_refVal=https%3A%2F%2Fwww.cdc.gov% 2Fcoronavirus%2F2019-ncov%2Finfection-control%2Fcontrol- recommendations.html].
11. Gandhi M, Yokoe DS, Havlir DV, Asymptomatic Transmission, the Achilles' Heel of Current Strategies to Control Covid-19, New England J Med. Abril 2020Disponible en: https://www.nejm.org/doi/full/10.1056/NEJMe2009758.
12. Sandoui A. Why does SARS-CoV-2 spread so easily? Medical News Today; Marzo 2020. Disponible en: [https://www.medicalnewstoday.com/articles/why-does-sars-cov-2-spread-so-easily#Spike-protein-on-the-new-coronavirus].
13. Manzanares R, Manzanares A; El Covid-19, ese enemigo invisible. Dental Tribune 2020. Disponible en: [https://la.dental-tribune.com/news/el-covid-19- ese-enemigo-invisible]
14. Huayanca Rios, Ingrid Estefania. Bioseguridad en Odontología en el contexto de COVID-19. Universidad Nacional Mayor de San Marcos, Facultad de Odontología. Lima, Perú. 2021.
15. Sepúlveda VC, Secchi AA, Donoso-Hofer F., Consideraciones en la Atención Odontológica de Urgencia en Contexto de Coronavirus COVID-19 (SARS-CoV-2), Int J Odontostomat 2020; 14(3):279-284. Disponible en: [http://www.ijodontostomatology.com/wpcontent/uploads/2020/03/2020_v14 n3_003.pdf]
16. Equipo de Investigación Normas de Higiene y Bioseguridad en la Formación de Odontólogos. SECyT 05/J080, INTRODUCCIÓN A LAS NORMAS DE BIOSEGURIDAD. Universidad de Cordoba. Facultad de Odontologia. 2015.
17. Organización Colegial de Dentistas de España. Consejo Dentistas. Plan Estratégico de Acción para el período posterior a la crisis creada por el COVID-19. 2020 Abr. Disponible en: [https://www.consejodentistas.es/comunicacion/actualidad-consejo/notas- de-prensa-consejo/item/1763-plan-estrategico-de-accion-para-el-periodo- posterior-a-la-crisis-creada-por-el-covid-19.html].

18. Guerra S, Equipo de Protección Personal (EPP) para la asistencia de pacientes con COVID-19: lo que debemos saber. CONAE. Videoconferencia 1: "Uso de EPP en COVID-19" MSP. Disponible en: [https://www.youtube.com/watch?v=n_e6rZfMCFg].
19. Negroni M. Microbiología estomatológica: fundamentos y guía práctica. 3º edición. Buenos Aires, Editorial Médica. Panamericana, 2018.
20. Araya Salas, Cristóbal. Consideraciones para la Atención de Urgencia Odontológica y Medidas Preventivas para COVID-19. Int. J. Odontostomat. 2020.
21. OMS. Equipo de protección personal. Disponible en: [https://www.who.int/csr/resources/publications/epp-oms.pdf?ua=1]
22. Sigua-Rodríguez, E.A; Bernal Pérez, J.L.; Lanata Flores, A.G; Sánchez Romero C.; Rodríguez Chessa, J; Haidar, Z. S; Olate, S. y Iwafi Filho, L. COVID-19 y la Odontologia: una Revisión de las recomendaciones y perspectivas para Latinoamérica. Int. J. Odontostomat, 2020.
23. Pumarola A, Rodríguez-Torres A, García-Rodríguez JA, Piédrola-Angulo G. Microbiología y Parasitología Médica. 2ed. Barcelona, Salvat Editores, 1987.
24. Requerimientos para uso de equipos de protección personal (EPP) para el nuevo coronavirus (2019-nCoV) en establecimientos de salud. 2020. Disponible en: [https://www.paho.org/es/documentos/requerimientos-para- uso-equipos-proteccion-personal-epp-para-nuevo-coronavirus-2019-ncov].
25. Organización Colegial de Enfermería. Mascarillas COVID-19, [Infografía] 2020 marzo. Disponible en: [https://www.consejogeneralenfermeria.org/covid-19].
26. Organización Colegial de Enfermería. Aclaraciones sobre el uso de mascarillas, Infografía. 2020 Mar; Disponible en: [https://www.consejogeneralenfermeria.org/covid-19].
27. Pankhurst CL, Coulter WA. Protección personal para prevenir el contagio de infecciones. En: Prevención y control de enfermedades infecciosas en Odontología. Ciudad de México: El Manual Moderno, 2018.
28. European Centre for Disease Prevention and Control. Safe use of personal protective equipment in the treatment of infectious diseases of high consequence. 2014. Disponible en: [https://www.ecdc.europa.eu/sites/default/files/media/en/publications/Publica tions/safe-use-of-ppe.pdf].
29. European Centre for Disease Prevention and Control. Cloth masks and mask sterilisation as options in case of shortage of surgical masks and respirators. 2020. Disponible en: [https://www.ecdc.europa.eu/en/publications-data/cloth-masks-sterilisation- options-shortage-surgical-masks-respirators].
30. Provincial Infectious Diseases Advisory Committee. Routine Practices and Additional Precautions in All Health Care Settings, 3rd edition, 2012. Disponible en: [https://www.publichealthontario.ca/-/media/documents/bp- rpap-healthcare-settings.pdf].
31. Papone Yorio V, Manual de Bioseguridad en Odontología. 2ed. Montevideo: Facultad de Odontología, 2010.
32. Jansen K. How we know disinfectants should kill the COVID-19 coronavirus? Disponible en: [https://cen.acs.org/biological- chemistry/infectious-disease/How-we-know-disinfectants-should-kill-the- COVID-19-coronavirus/98/web/2020/03].
33. AIDIS Uruguay, OPS, OMS. Recomendaciones de saneamiento Ambiental en prevención del COVID-19. Disponible en: [https://aidis.org.uy/1655-2/].
34. OMS, Bioseguridad. 2005. Disponible en: [https://www.who.int/es/home/search?query=biosegu-ridad].
35. Bolaños M. “Nivel de conocimiento y su relación con la actitud sobre la aplicación de las normativas de la bioseguridad en la práctica diaria de los profesionales odontólogos y

asistentes dentales de los departamentos de odontología de las unidades operativas de salud. 2016. Disponible en: [http://www.dspace.uce.edu.ec/bitstream/25000/5751/1/T-UCE-0015- 272.pdf].
36. Díaz Valdez, Yuleisi del Carmen. Nivel de conocimiento sobre bioseguridad frente a la COVID-19.en cirujanos dentistas, Tacna. 2022. Disponible en: [https://repositorio.ucv.edu.pe/bitstream/handle/20.500.12692/96298/Diaz_V YDC-Ramos_VMM-SD.pdf?sequence=1&isAllowed=y].
37. Clarisse Díaz-Reissner, Carlos G. Adorno, Leticia Cataldi, Vicente Reinaldo Fretes, Gabriela R. Ballasch, Cynthia Mireya Jara. Medidas empleadas por odontólogos paraguayos para disminuir el riesgo biológico en la práctica odontológica durante la pandemia de Covid-19. Octubre 2021.

FINANCIAL SUPPORT

None.

CONFLICT OF INTEREST

None.