The impact of Covid-19 on the pediatric dentistry clinic: An integrative review

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Highlights

The COVID-19 pandemic change the dental care protocols, because dental office has a high risk of cross-infection for health professionals.

In pediatric dentistry, dental care has to be reduced to cases of urgency and emergency during the COVID-19 pandemic.

When the dental intervention in pediatric dentistry is necessary, non-invasive or minimally invasive techniques that reduce aerosols should be prioritized.

Abstract

At the end of 2019, new cases of pneumonia of unknown etiology were identified in China, the cause was attributed to a new type of coronavirus, this infection quickly spread to other countries and gained pandemic status by World Health Organization (WHO) in March 2020. Therefore, containment measures were taken, including social isolation and pause in dental care, since the aerosols generated during this care are classified as high risk for contamination by COVID-19. In this context, children do not seem to be very affected by this infection, since the number of cases is low, but they are considered asymptomatic carriers, contributing to the transmission of the virus to other people. Therefore, the aim of this study was to review the literature in an integrative way, seeking to elucidate the impacts of these factors on the clinical practice of pediatric dentistry. The search resulted in 290 articles, of which 33 were selected for full reading, and 29 articles were included in the integrative review. The COVID-19 pandemic greatly changed the practice in dentistry, new biosafety protocols were established, aiming to minimize viral spread, in pediatric dentistry, dental care was reduced to cases of urgency and emergency, as children are asymptomatic carriers of viruses and when they manifest symptoms, they are less severe when compared to adults. Another recommendation is that whenever dental intervention in pediatric dentistry is necessary, non-invasive or minimally invasive techniques that reduce aerosols should be prioritized.

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INTRODUCTION

In late 2019, a series of pneumonia events, of unknown etiology, were reported in the city of Wuhan, Hubei province, China. With the spread of new cases in other regions and countries, the cause has been attributed to a new type of coronavirus. In February 2020, this respiratory disease was named COVID-19, or “coronavirus disease 2019” by World Health Organization (WHO) ¹, the new coronavirus being called SARS-CoV-2 by the International Virus Taxonomy Committee. In March 2020, WHO classified it as a pandemic, a public health emergency of international interest.²⁻⁴

In September 2020, the term syndemia is introduced for COVID-19. Syndemia "characterizes the mutually aggravating interaction between health problems in populations in their social and economic context". The biological interactions, linked to social and economic factors, have become important for the prognosis, treatment and development of health policies to control the spread of COVID-19.⁵

The new coronavirus belongs to the Coronaviridae family, being divided into alpha coronavirus and beta coronavirus (infecting the respiratory, gastrointestinal and central nervous systems of humans and mammals) and gamma-coronavirus and betacoronavirus (mainly infecting birds).⁶ It is believed that the period of incubation period is approximately 5 to 6 days, ranging from 2 to 14.²

The main means of transmission of this disease are droplets of saliva or nasal, oral and ocular secretions from asymptomatic or symptomatic individuals.^{4,6,7}

Fever, cough, myalgia, kidney failure and acute respiratory disease stand out as signs and symptoms. In addition, anosmia and ageusia are considered prodromic signs. The clinical course is not yet fully understood, being heterogeneous between adults and children. While symptomatic adults can evolve to a severe condition, children are asymptomatic or mostly mild or moderate symptomatic.⁸⁻¹⁰

Considering the combination of the means of transmission of the disease, the absence of vaccine, the “very high” risk of contamination by the

dentist, and of every child being considered asymptomatic carrier, the convenience of an integrative review on the impact of these factors is evident in the practice of pediatric dentistry.

METHODS

Study design

It is an integrative review, which is a study based on bibliographic productions, allowing a theoretical analysis of a subject, filling a knowledge gap, with consequent application of results in practice. Its application in the health area is relevant and has been widely used in order to recap the research available on specific subjects, reorienting practical attitudes.¹¹

This research obeys the quality indicators for Integrative Review articles, being elaborated in the phases: definition of the guiding question; literature search; data collect; critical analysis of the included studies; discussion of results and presentation of the integrative review.¹¹

Search strategy

The literature review was performed based on the active search for information in the PubMed, Scopus, Lilacs, Bireme, Scielo databases. The searches were performed by the author BEdeD; they were carried out in articles published until October 3, 2020, excluding those published after this date.

The search strategy for each database was developed using the AND and OR combination of free terms and MeSH terms. Terms related to COVID-19 infection ("new coronavirus", "Novel Coronavirus", "Nuevo Coronavirus", "Novo Coronavirus", "Coronavirus disease", "Enfermedad por Coronavirus", "severe acute respiratory syndrome coronavirus 2", "2019-ncov", "ncov 2019", "2019ncov", "covid19", "COVID-19", "covid2019", "covid-2019", "covid 2019", "srag-cov-2", "sars-cov-2", "sars2", "sars 2", "sars cov 2", "cov19", "cov2019", "Coronavirus*", "Severe Acute Respiratory Infections", "Severe Acute Respiratory Infection", "Coronavirus 2", "acute respiratory disease", "Betacoronavirus", "Coronavirus infections",

“sars vírus”, “Wuhan market vírus”, “virus mercado Wuhan”, “Wuhan Coronavirus”, “Coronavirus de Wuhan”) AND “pediatric dentistry” were combined with each other in all database searches.

The intention of this integrative review is to locate, interpret and synthesize the volume of evidence produced in this pandemic period and incorporate it in the decisions of control, treatment and pediatric procedures.

Article eligibility criteria

The articles identified by the initial search strategy were selected according to the following inclusion criteria: articles whose themes referred to the management and dental care of pediatric patients, or which dealt with biosafety in dentistry during the COVID-19 pandemic; published until October 3, 2020, abstract and / or articles available online for full reading. Articles that did not answer the guiding question; published as of October 4, 2020, abstracts and / or articles that were not available online for reading in full and duplicate articles in the databases were excluded.

Selection of publications and data extraction

The titles resulting from the search in all databases were arranged in a Microsoft Excel® spreadsheet so that repeated titles could be verified; reading the titles and excluding those that did not fit the inclusion criteria, the resulting abstracts

were read in sequence and, subsequently, the pre-selected articles were read in full to determine the review sample.

The selection was made by the author BEdeD1, under the supervision of the author DD², the articles were chosen by consensus.

The data tabulated and presented in a table support the construction of the biosafety protocol and care for infant patients ”.

RESULTS

The search in the databases resulted in 277 articles and 13 more from other sources, with 290 articles pre-selected. After removing duplicates (52) and reading the titles and abstracts, 33 articles were selected for full reading, of which 29 articles were included in the integrative review, 209 studies were excluded because they did not fit the study subject (Figure 1).

All of the 29 selected articles were published in the year 2020, the majority being published in the months of April, May and June. Most of the selected articles were published in English, only two were published in Spanish, one in Portuguese and one in Chinese (Table 1). Most of the selected articles are letters to the editor, editorials, and literature reviews, this shows the scarcity of publications on the topic. The guiding question of the research seeks to emphasize the influence of the pandemic in the clinical practice of pediatric dentistry, as well as to evaluate and synthesize protocols implemented in the post-pandemic.

Figure 1. Search strategy and selection of articles

Table 1. Selected articles

<i>Author</i>	<i>Title</i>	<i>Main subject studied</i>	<i>Magazine</i>	<i>Language</i>	<i>Month/Year</i>
Jayaraman, et al. ¹⁷	Impact of COVID-19 on Pediatric Dental Practice in the United States	Guidelines on care in pediatric dentistry	Pediatric dentistry	English	May/20
LAAPD * ¹⁶	Ruta de atención para procedimientos de Odontología Pediátrica urante la etapa de confinamiento o cuarentena de la pandemia COVID-19	Guidelines on care in pediatric dentistry	Revista de Odontopediatría Latinoamericana	Spanish	April/20
Ferrazzano, et al. ⁶	COVID-19 Disease in Children: What Dentists Should Know and Do to Prevent Viral Spread. The Italian Point of View	Guidelines on care in pediatric dentistry, symptoms in children	International journal of environmental research and public health	English	April/20
Al- Halabi et al. ⁷	Assessment of paediatric dental guidelines and caries management alternatives in the post COVID- 19 period. A critical review and clinical recommendations	Guidelines on care in pediatric dentistry	European Archives of Paediatric Dentistry	English	April/20
Mantovani et al. ⁸	Coronavirus disease 2019 (COVID-19) in children and/or adolescents: a meta-analysis	Symptoms observed in children	Pediatric research	English	June/20
Ilyas et al. ¹⁹	COVID-19 pandemic: the first wave – an audit and guidance for paediatric dentistry	Guidelines on care in pediatric dentistry	British Dental Journal	English	June /20
Carlotti, et al. ¹⁴	COVID-19 Diagnostic and Management Protocol for Pediatric Patients	Symptoms observed in children and therapeutic protocols	Clinics	English	March/20
Sun, et al. ¹⁵	Clinical features of severe pediatric patients with coronavirus disease 2019 in Wuhan: a single center's observational study	Symptoms observed in children	World Journal of Pediatrics	English	Feb/20
LAAPD * ²¹	Teleodontología: Aplicación a la Odontopediatría durante la pandemia COVID-19	Use of Teledentistry in pediatric dentistry	Revista de Odontopediatría Latinoamericana	Spanish	May/20
Sahu et al. ²	Coronavirus disease (COVID-19): Characteristics in children and considerations for dentists providing their care	Guidelines on pediatric care and symptoms found in children	International journal of paediatric dentistry	English	April/20
Dong, et al. ¹²	Epidemiology of COVID-19 Among Children in China	Clinical characteristics in children and epidemiological aspects	Pediatrics	English	June/20
Peditto et al. ⁴	Dentistry during the COVID-19 Epidemic: An Italian Workflow for the Management of Dental Practice	Guidelines on care in pediatric dentistry	International journal of environmental research and public health	English	May/20
Casamassimo, et al. ²²	Pediatric Dentistry During and After COVID-19	Guidelines on care in pediatric dentistry	Pediatric dentistry	English	April/20
LAAPD * ²³	Tratamento da doença cárie em época de COVID-19: Protocolos clínicos para controle dos aerossóis.	Guidelines on care in pediatric dentistry	Revista de Odontopediatría	Portuguese	April /20

Table 1. Selected articles (continued)

<i>Author</i>	<i>Title</i>	<i>Main subject studied</i>	<i>Magazine</i>	<i>Language</i>	<i>Month/Year</i>
Lu, et al., ⁹	SARS-CoV-2 Infection in Children	Symptoms observed in children	The new England Journal of medicine	English	April /20
Martins-Júnior, et al., ²⁰	Implications for dental professionals when caring for paediatric patients	Guidelines on care in pediatric dentistry	Evidence-Based Dentistry	English	June/20
Pecoraro, et al, ²⁷	The psychophysical impact that COVID-19 has on children must not be underestimated	Psychological impacts on children post social isolation	Acta Paediatrica	English	May/20
Wang, et al., ³¹	Oral health management of children during the epidemic period of coronavirus disease 2019	Guidelines on care in pediatric dentistry	Sichuan Da Xue Xue Bao Yi Xue Ban	Chinese	March/20
Amorin, et al., ²⁴	New Post-COVID-19 Biosafety Protocols in Pediatric Dentistry	Biosafety protocols in pediatric dentistry after COVID-19	Pesquisa Brasileira em Odontopediatria e Clínica Integrada	English	June/20
Sun, et al., ³	Knowledge of and attitudes toward COVID-19 among parents of child dental patients during the outbreak	Parental knowledge level during the social isolation of the COVID-19 pandemic	Braz. Oral Res.	English	May/20
Brodin , P ¹¹	Why is COVID-19 so mild in children?	Symptoms observed in children	Acta Paediatrica	English	April /2020
BaniHani, A., et al, ³³	Could COVID-19 change the way we manage caries in primary teeth? Current implications on Paediatric Dentistry	Guidelines on care in pediatric dentistry	Int J Paediatr Dent	English	June/2020
Acharya S. et al, ²⁵	How to deal and learn from the threat of COVID-19 in paediatric dentistry	Guidelines on care in pediatric dentistry	Eur J Paediatr Dent	English	September/2020
Saleha Shah ²⁶	COVID-19 and paediatric dentistry- traversing the challenges. A narrative review	Guidelines on care in pediatric dentistry	Annals of Medicine and Surgery	English	October/2020
Dellagiulia A. et al, ²⁸	Early impact of COVID-19 lockdown on children sleep: a four-week longitudinal study	Impact of social isolation by COVID-19 on children's sleep.	J Clin Sleep Med	English	September /2020
Baptista, AS et al, ³⁰	Can children's oral hygiene and sleep routines be compromised during the COVID-19 pandemic?	Guidelines on care in pediatric dentistry	Int J of Paed Dent	English	September /2020
Bahramian H. et al., ¹⁸	COVID-19 Considerations in Pediatric Dentistry	Guidelines on care in pediatric dentistry	JDR Clinical & Translational Research	English	July/2020
Campagnaro R et al, ²⁹	COVID-19 pandemic and pediatric dentistry: Fear, eating habits and parent's oral health perceptions	Guidelines on care in pediatric dentistry	Child Youth Serv Rev	English	November/2020
Cianetti S. et al, ³²	Model for Taking Care of Patients with Early Childhood Caries during the SARS-Cov-2 Pandemic	Guidelines on care in pediatric dentistry	Int. J. Environ. Res. Public Health	English	May/2020

Key: * LAAPD = Latin American Association of Pediatric Dentistry

DISCUSSION

The pandemic established by COVID-19 forced healthcare professionals to change their care. Dentistry has significantly changed the routine of clinical practice, in the context of private practice and public services.

However, the absence of official guidance from health agencies and agents, challenged a search for worldwide bibliography, in order to systematize guiding recommendations for a safe clinical practice for infant patients and their family nucleus, dental surgeon and staff involved in the care.

The discussion of this research is based on the identification, evaluation and synthesis of the elected articles, didactically presented in the following subtitles: Systemic signs and symptoms; Determinants of service needs; Care in procedures and procedures to be prioritized.

Systemic signs and symptoms

The signs and symptoms in children, when compared to adult individuals, appear to be less severe, with a better prognosis and a very low mortality rate. It is advocated that the child has an innate and more active immune response, fewer ACE-2 receptors and/or acquired cross-immunity from previous contact with other coronaviruses and enteroviruses.¹² Add to that less base comorbidities and a weaker acute inflammatory response to the COVID-19.^{7,8,10,12-14}

Fever and cough are common, and pharyngeal erythema, diarrhea, nasal congestion, dyspnoea, abdominal pain and skin rash may also be present. Polypnea, sputum, nausea, vomiting, headache, fatigue, constipation are exacerbations

of signs and symptoms when COVID-19 is associated with comorbidities such as leukemia and hydronephrosis.^{7-10,14,15}

Radiographically, unilateral or bilateral pneumonia can be seen with signs of peripheral opacity. In more critical situations, ground glass opacity, pleural effusion and “white lung type” changes are detected.^{7,9,10,15,16}

Hematological tests show normality or with a reduction in white blood cells, eventually presenting leukopenia and lymphocytopenia. Levels of C-reactive protein may be normal or elevated. In more severe situations, they may be accompanied by an increase in liver enzymes.^{10,15}

Determinants of service needs

We must assume that all children and their parents and / or guardians are potentially carriers of the virus, increasing the risk of cross-infection for health professionals^{8,17,18}, so it is important to determine when it is necessary to perform a child's face-to-face care. In this pandemic period, it is essential to define what is urgency and emergency in pediatric dentistry.^{17,19}

By definition, emergency is any situation where the patient's life is at risk and needs immediate care, dental emergencies must be treated exclusively in a hospital environment, as urgency is the management of complications that require immediate treatment for pain relief and control of infection.¹⁷ Dental emergencies must be handled within an hour, whereas emergencies can be handled within the first 24 hours.⁴ In Table 2, we present the main dental conditions that are characterized as emergencies and urgencies.

Table 2. Procedures classified as urgent and emergency in pediatric dentistry

Emergency	Urgency
Excessive bleeding ^{4,8,17}	Severe irreversible pulpitis ^{4,17} Pericoronitis ^{4,17}
Facial cellulitis with intra and extra oral edema that compromises the airways or deep planes ^{4,8,17}	Dentoalveolar abscess ^{4,8,17} Painful dental fracture ^{4,8,17} Alveolite ^{4,17} Dental trauma with avulsion or dislocation ^{4,8,17}
Dentofacial trauma that can compromise the airways ^{8,17}	Bleeding ^{8,17} Biopsy or dental preparation prior to medical procedures ^{4,8,17}

Standard Precautions during patient care

The Latin American Association of Pediatric Dentists recommends that during the period of social isolation dental care should be performed only in patients with cases of emergency and urgency, postponing elective treatment.¹⁷

Even treating only cases of emergency and urgency, it is essential that some care is performed, the screening of these cases must be performed through remote care (Teledentistry) in order to identify the situations that require face-to-face care, and to manage the elective cases.

After identifying the cases that require dental care during this period, appropriate biosafety measures must be taken, in addition, the use of techniques that reduce the generation of aerosols should be prioritized, thus reducing the risk of cross-contamination by COVID-19.^{4, 7, 8, 12, 15-24} In Figure 2 we present a suggested care protocol for pediatric patients in the period of social isolation due to COVID-19.

Figure 2. Suggested care protocol for pediatric patients in the period of social isolation due to Covid-19

Teledentistry in pediatric dentistry

Teledentistry is an indispensable modification in care in the face of a public health crisis, especially when face-to-face contact between patient and health professional is not possible, due to geographic or sanitary restrictions.¹⁹ Teledentistry can be implemented through telephone resources, platforms tools and digital means that allow diagnosis, therapeutic guidance, patient control, in addition to defining the need or not for face-to-face care.^{12, 17, 25}

Three types of teleconsultations are defined: asynchronous consultation, generally used when the patient or caregiver seeks the professional to consult their point of view, requires a waiting time between sending the question or request and the specialist's response; synchronous consultation, when the virtual consultation is in real time through telephone calls or preferably by video conference; mixed query is when using both synchronous and asynchronous queries.²²

When conducting screening using this model, it is important to ask about signs and symptoms, pain and its characteristics, the presence of edema and fever. In situations of facial trauma, affected structures, active bleeding and involved teeth are investigated. The request for images assists in defining the need or not for face-to-face assistance.^{17, 22}

It is recommended that the virtual consultation is preceded by a questionnaire and the communication, like a face-to-face consultation, should be administered safely, with a soft and calm voice, in order to convey confidence to the patient. The clarification to the patient and / or caregiver regarding the benefits and limitations of this type of consultation must be emphasized.²²

The virtual consultation allows anamnestic recording, however, as there is no possibility of the physical-clinical examination, a presumptive diagnosis is made and, if necessary, therapeutic recommendations. Particularly in pediatric dentistry, therapeutic recommendations must obey the concepts of pharmacological prescriptions, providing textual guidance to parents or guardians.²²

It is necessary to emphasize that if the virtual consultation indicates the need for face-to-face assistance, this must be authorized with the signature of the Informed Consent Form by the family nucleus and evidently respect all biosafety rules.²²

Biosafety in pediatric dentistry in times of COVID-19 pandemic

The literature presents experiences in pediatric dentistry, where it was possible to diagnose caries lesions and make treatment decisions by means of intraoral cameras or images obtained through smart phones with the support of dental or personal assistants. The high transmissibility standard of COVID-19 can cause contamination in dentists and the dental environment favors cross-contamination. As a result, some biosafety protocols have been devised. In general, they encourage the avoidance of crowding, avoid the use of books / magazines, toys and plush toys in the waiting room, limit the number of daily appointments, use of masks for the patient and companion, disposable shoe protectors, hats, strict washing of clothes. hands.^{26, 27}

Regarding the professional using PPE and providing measures to reduce contamination: physical barriers in the clinical environment, cleaning and disinfecting surfaces / objects / environments with sanitizing products, goggles and face protectors, disposable aprons, respiratory masks with particulate filter, gloves and hats. Technically, aerosol-producing procedures should be avoided, and when produced, if possible, use physical barriers and / or dental aerosol vacuuming (high-power suction) and rubber dam.^{4,17,18,25,26}

Procedures to be prioritized

The strategy recommended by WHO is the temporary suspension of elective procedures during the pandemic, which is controversial in relation to the recommendations of entities in the pediatric class. It is essential that each clinical situation is determined through its specificities and that associations of techniques can be performed during this period. Another important

point to be considered is the psychological issue involved in this moment of isolation.^{17,28-31}

Emotional disorders, depression, irritability, insomnia, stress, emotional exhaustion are examples of the symptoms reported in situations of quarantine and social isolation. These factors can influence the routine of eating, sleeping, oral hygiene and explain the difficulties that families have been facing due to the need for adaptations in this period.^{30,31}

At the time of social isolation, where we do not yet have a vaccine and since dental care is considered to be at high risk of infection by COVID-19, we must prioritize urgent care and give preference to procedures that do not generate aerosols, especially minimally invasive, which are based on modern concepts for treatment and control of caries disease through a conservative approach.^{8,17-19,32,33}

The emergency care services listed in Table 2, which require immediate treatment, must be performed following all the rules of the proposed biosafety protocols and the regulations defined by the health regulatory agency of each country.

In the treatment of caries disease, priority is given to techniques that do not generate aerosols, such as supervised tooth brushing, the use of low rotation, fluoride varnish, sealants, atraumatic restoration, selective removal of decayed dentin, application of silver fluoride diamine, non-control cavity restorer and hall technique.^{8,17,18,21,34}

Final Considerations

Unquestionably the COVID-19 pandemic changed the behavior of the dental surgeon and their team, as well as the patient. This change is most strongly noticed in Pediatric Dentistry, given that the child alone, demonstrates a relative degree of anxiety in the face of medical and dental procedures. In addition, it always requires an escort. Social distancing itself has contributed negatively to the child's behavior, from a psychological point of view.

These factors associated with the risk of contamination by the new coronavirus in the dental environment, require strict compliance with biosafety rules and the care protocol,

restricting the risks of contamination for the population and oral health professionals.

It is important to reinforce the strategies of dressing and de-dressing, waste disposal, surface disinfection and use of PPE.

We underline the importance of differentiating emergency and urgent interventions, and in mandatory face-to-face interventions, prioritize non-invasive or minimally invasive techniques that do not generate aerosols.

Considering that, still, we do not have consensus and strong scientific evidence on all measures and protocols, they are subject to change.

REFERENCES

1. World Health Organization. Coronavirus disease (covid-19) pandemic [Internet] [cited 10 Nov 2020]. Available from: <https://www.who.int/es/emergencies/diseases/novel-coronavirus-2019>
2. Sahu KS, Mishra AK, Lal A. Covid-2019: update on epidemiology, disease spread and management. *Monaldi Arch Chest Dis* 2020;90:197-205
3. Sun J, Xu Y, Qu Q, Luo W. Knowledge of and attitudes toward Covid-19 among parents of child dental patients during the outbreak. *Braz Oral Res* 2020;34:e066
4. Peditto M, Scapellato S, Marcianò A, Costa P, Oteri G. Dentistry during the Covid-19 Epidemic: An Italian Workflow for the Management of Dental Practice. *Int J Environ Res Public Health* 2020;17:3325-3339
5. Lemke MK, Apostolopoulos Y, Sönmez S. A novel COVID-19 based truck driver syndemic? Implications for public health, safety, and vital supply chains. *Am J Ind Med* 2020;63:659-662
6. Fini MB. What dentists need to know about Covid-19. *Oral Oncol* 2020;28:104741
7. Ferrazzano GF, Ingenito A, Cantile T. Covid-19 Disease in Children: What Dentists Should Know and Do to Prevent Viral Spread: The Italian Point of View. *Int J Environ Res Public Health* 2020;17:3642-3648

8. Al- Halabi M, Salami A, Alnuaimi E, Kowash M, Hussein I. Assessment of paediatric dental guidelines and caries management alternatives in the post Covid-19 period. A critical review and clinical recommendations. *Eur Arch Paediatr Dent* 2020;21:543-556
9. Mantovani A, Rinaldi E, Zusi C, Beatrice G, Saccomani MD, Dalbeni A. Coronavirus disease 2019 (COVID-19) in children and/or adolescents: a meta-analysis. *Pediatr Res* 2020 Jun 17. Doi: <https://doi.org/10.1038/s41390-020-1015-2>
10. Lu X, Zhang L, Du H, Shen K, Zhang J, Li Y, et al. SARS-CoV-2 Infection in Children. *The N Eng J Med* 2020;382:1663-1665
11. Reis JG, Martins F, Lopes MH. Indicativos de qualidade para artigos de Revisão Integrativa. *Tech Rep* 2015;2020:220-228
12. Brodim P. Why is Covid-19 so mild in children? *Acta Paediatr* 2020;109:1082-1083
13. Dong Y, Mo X, Hu Y, Qi X, Jiang F, Jiang Z, et al. Epidemiology of Covid-19 Among Children in China. *Pediatrics* 2020;145:e20200702
14. Mallineni SK, Raggio DP, Araujo MP, Robertson MD, Jayakumar Jayaraman. Coronavirus disease (COVID-19): Characteristics in children and considerations for dentists providing their care. *Int J Paediatr Dent* 2020;30:245-250
15. Carlotti APCP, Carvalho WB, Johnston C, Rodriguez IS, Delgado AF. Covid-19 Diagnostic and Management Protocol for Pediatric Patients. *Clinics* 2020;75:e1894
16. Sun D, Li H, Lu XX, Xiao H, Ren J, Zhang FR et al. Clinical features of severe pediatric patients with coronavirus disease 2019 in Wuhan: a single center's observational study. *World J Pediatr* 2020;16:251-259
17. Asociación Latinoamericana de Odontopediatría. Grupo Covid-19. Ruta de atención para procedimientos de Odontología Pediátrica durante la etapa de confinamiento o cuarentena de la pandemia COVID-19. *Rev Odontopediatr Latinoam* 2020;10:1-10
18. Jayaraman J, Dhar V, Moorani Z, Donly K, Tinanoff N, Mitchell S et al. Impact of COVID-19 on Pediatric Dental Practice in the United States. *Pediatr Dent* 2020;42:180-183
19. Bahramian H, Gharib B, Baghalian A. COVID-19 Considerations in Pediatric Dentistry. *JDR Clin Trans Res* 2020;5:307-311
20. Ilayas N, Agel M, Mitchell J, Sood S. Covid-19 pandemic: the first wave – an audit and guidance for paediatric dentistry. *Br Dent J* 2020;228:927-931
21. Martins-Júnior PA, Coutinho DCO, Paiva SM. Implications for dental professionals when caring for paediatric patients. *Evid Based Dent* 2020;21:54-55
22. Asociación Latinoamericana de Odontopediatría. Teleodontología: Aplicación a la Odontopediatría durante la pandemia COVID-19. *Rev Odontopediatr Latinoama* 2020;10:11-19
23. Casamassimo PS, Townsend JA, Litch S. Pediatric Dentistry During and After covid-19. *Pediatr Dent* 2020;42:87-90
24. Asociación Latinoamericana de Odontopediatría. Tratamiento de la enfermedad de caries en época de covid-19: protocolos clínicos para el control de aerosoles. *Rev Odontopediatr Latinoama* 2020;10:20-25
25. Amorim LM, Maske TT, Ferreira SH, Santos RB, Feldens CA, Kramer PF. New post-Covid-19 biosafety protocols in pediatric dentistry. *Pesqui Bras Odontopediatria Clin Integr* 2020;20:e0117
26. Acharya S, Singh B, Godhi B, Godhi B, Pandey S. How to deal and learn from the threat of COVID-19 in paediatric dentistry. *Eur J Paediatr Dent* 2020;21:173-175
27. Saleha S. COVID-19 and paediatric dentistry-traversing the challenges. A narrative review. *Ann Med Surg* 2020;58:22-33
28. Pecoraro L, Carbonare LD, De Franceschi L, Piacentini G, Pietrobelli A. The psychophysical impact that covid-19 has on children must not be underestimated. *Acta Paediatr* 2020;109:1679-1680
29. Dellagiulia A, Lionetti F, Fasolo M, Verderame C, Sperati A, Alessandri G. Early impact of Covid 19 lockdown on children sleep: a four-week longitudinal study. *J Clin Sleep Med* 2020;16:1639-1640

30. Campagnaro R, Collet GdeO, Andrade MPde, Salles JPSL, Fracasso MLC, Scheffel DLS, et al. COVID-19 pandemic and pediatric dentistry: Fear, eating habits and parent's oral health perceptions. *Child Youth Serv Rev* 2020;118:105469
31. Baptista AS, Prado IM, Perazzo MF, Pinho T, Paiva SM, Pordeus IA, Serra-negra JM. Can children's oral hygiene and sleep routines be compromised during the COVID-19 pandemic? *Int J Paediatr Dent* 2020 Sep 25. Doi:10.1111/ipd.12732
32. Wang Y, Zhou C, Shu R, Zou J. Oral Health Management of Children during the Epidemic Period of Coronavirus Disease 2019. *J Sichuan Union Univ Eng Sci Ed* 2020;51:151-154
33. Cianetti S, Pagano S, Nardone M, Lombardo G. Model for Taking Care of Patients with Early Childhood Caries during the SARS-Cov-2 Pandemic. *Int J Environ Res Public Health* 2020;17:3751-3760
34. BaniHani A, Gardener C, Raggio DP, Santamaría, RM, Albadri, S. Could COVID-19 change the way we manage caries in primary teeth? Current implications on Paediatric Dentistry. *Int J Paediatr Dent* 2020;30:523-525

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