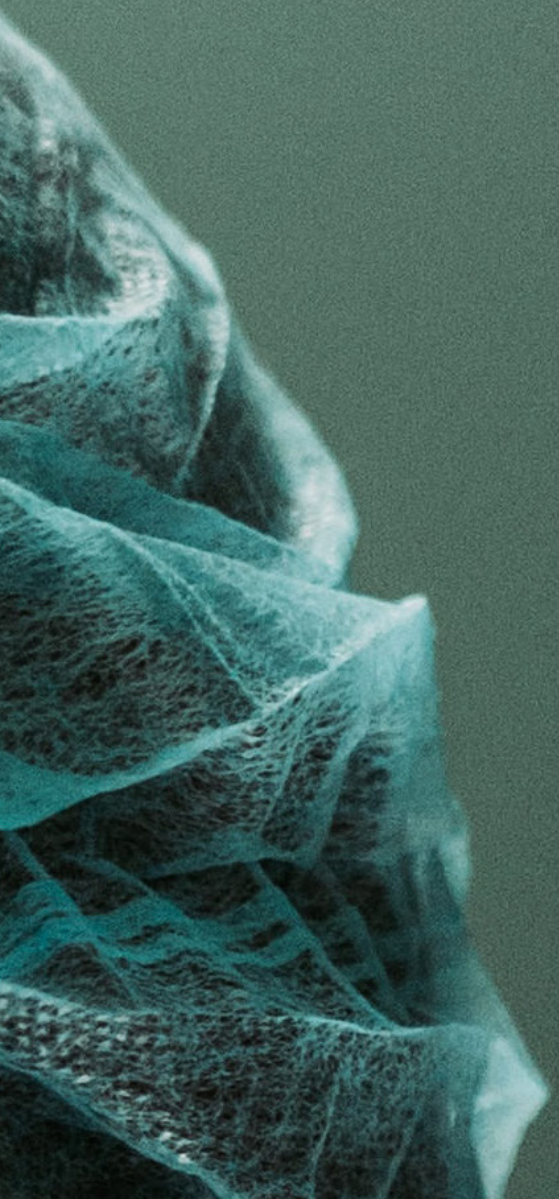
EXTENSION

PEDIATRIC DENTISTRY

CLINICAL GUIDELINES

DENTISTRY



COVID-19

Scientific paper drawn up by the COVID-19 MD group aiming the dissemination of the knowledge about the clinical practice in Dentistry in the context of COVID-19.

COVID-19 MD

IMPRENSA DA UNIVERSIDADE DE COIMBRA
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Title:
COVID-19. Clinical Guidelines Dentistry
Pediatric Dentistry Extension

Edition
Imprensa da Universidade de Coimbra
Coimbra University Press

Email: imprensa@uc.pt
URL: http://www.uc.pt/imprensa_uc

eISBN: 978-989-26-2110-4
DOI: https://doi.org/10.14195/978-989-26-2110-4

The expression *Clinical Guidelines* refers to a scientific methodology and type of publication arising from it. This document should not, thus, be understood as legislation nor as any type of imposition of regulatory or legal nature. It is a scientific contribution to the broadening of the knowledge about the professional practice in the context of COVID-19, hopefully serving its recipients.

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Version 1.0.1 | June, 02nd of 2020.

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Preliminary remark

Given the fact that the COVID-19 disease is an extremely recent one and that, consequently, there is a natural gap in the amount and quality of scientific evidence on this subject, the drafting of some classical Clinical Guidelines is not possible. In this context, these Guidelines were drawn up according to the protocol recently made available by the English National Institute for Health and Care Excellence (NICE), namely the Interim process and methods for developing rapid guidelines on COVID-19 (nice.org.uk[2]).

These Clinical Guidelines are the result of the work developed by a committee of dentists.

There was no public consultation of representatives of every potential stakeholder about this topic. The goal is to produce Clinical Guidelines which might reduce the entropy and promote the consistency of intervention. However, an advisory board composed of different figures was created so as to review the Clinical Guidelines and proceed to its assessment, the composition of this board being listed in Appendix I.

We promote the identification of the key issues applicable to the scenarios upon return to the clinical practice in dentistry.

No systematic reviews of the literature were conducted. Even though searches were made in the most widely used databases, the main information contained in these Clinical Guidelines stems from the use of guiding documents previously published concerning pandemics that have already occurred.

As expected, there is very scarce literature regarding COVID-19, wherefore a great deal of the alternative basis of evidence we resorted to refers to *Severe Acute Respiratory Syndrome Coronavirus (SARS-CoV), Swine Pandemic (AH1N1) Influenza A and to Middle East Respiratory Syndrome Coronavirus (MERS-CoV)*

The databases of choice were:

1. Guides of the World Health Organization (WHO) on COVID-19
2. Recommendations of the Portuguese Directorate-General of Health (DGS)
3. NICE and SIGN
4. Cochrane collaboration
5. MEDLINE (via PubMed)
6. International and national scientific societies
7. The available evidence was simply ranked
    - The strategy of search is reproduced in Appendix I
    - Priority has been given to systematic reviews and meta-analysis
    - Followed by the search for randomized clinical trials
    - Followed by observational studies
    - Whenever it proved impossible, we searched for publications arising from the observation of experts in previous experiences
    - In those cases where no kind of evidence could be found, the experts who are the authors of these guidelines drew up the recommendations through discussion and consensus based primarily on biological plausibility.

We have made a summary critical assessment of the literature but we have not formally assessed the risk of the presence of biases resorting to specific scales.

However, we always briefly and simply indicated the kind of information underlying the clinical recommendations that were produced.

Objectives

Identify and classify the risks of acquisition and spread of SARS-CoV-2 in the context of pre-, peri-, and post-intervention in oral health.

Produce recommendations on how to act in pre-, peri-, and post-intervention in oral health for every element present at the clinical theater aiming to minimize the risk of acquisition and/or spread of SARS-CoV-2.

Scientific Relevance

Given that:

Over the course of the actual pandemic of COVID-19, several sources have identified the activity of dentistry as being at the top of the pyramid as far as the risk of acquisition and spread of the virus SARS-CoV-2 is concerned due to the enormous generation of aerosols which characterize it, the Portuguese government having ordered the provisional closure of the dentistry and stomatology clinics.

Currently, there are no national Clinical Guidelines which convey recommendations on how to act on every step of pre-, peri-, and post-intervention in dentistry aiming the prevention of the acquisition and spread of the virus SARS-CoV-2.

There is, therefore, the need to create these Clinical Guidelines as a set of recommendations on how to act, allowing the return to the activity of dentistry in safe conditions of those involved at the clinical theater, whether they are professionals, activity partners or the user population in general.

It should be noted that Clinical Guidelines intend to support the clinical decision. It is not a document which might replace the clinical decision, but rather one which the practitioner can lean on whenever heshe must choose the best course of action considering hisher experience, the patient's specific interests and the very clinical theater in which the practice takes place. It is not, therefore, a document which aims the tyrannization of evidence over the choice,

but one which only allows to decide taking into consideration the greatest robustness of evidence possible.

Topic/Disease

COVID-19 - Minimization of the risk of acquisition and spread of the disease in dentistry in the context of the pandemic.

Category

These are Clinical Guidelines on clinical governance advice, best practice and clinical safety.

Target Population

Patients of dentistry and members of the oral health staff.

Recipients of the Guidelines

All the parties concerned, namely: dentists, stomatologists, odontologists, pharmacists, nurses, oral hygienists, dental prosthetic technicians, clinic's support auxiliary personnel, receptionists, administrative staff, diagnosis and therapy technicians, senior technicians of safety and hygiene at work, technicians of clinical analysis, suppliers of dental material and equipment, medical sales representatives, maintenance technicians, waste collection technicians, professional associations, scientific societies, educational institutions, dentistry students, hospitals, insurance companies and conventions, commercial and industrial partners, policy makers, Portuguese Dental Association, Portuguese Health Authority, sectoral regulatory bodies and patients.

Introduction

Epidemiology

In a short period of time, COVID-19 has grown to pandemic proportions, being present in every continent to the exception of the Antarctica. According to the epidemiological bulletin issued by the Portuguese Health Authority (DGS) on 3rd May, in Portugal, there were 411 cases of children up to nine years of age and 755 young people aged between 10 and 19 years old[3].

The WHO, the American Centers for Disease Control and Prevention (CDC) and modern databases keep an updated interactive epidemiologic map.

Clinical Manifestations and Forms of Presentation of the Disease in Children

Infections with SARS-CoV, MERS-CoV and SARS-CoV-2 seem to affect children less frequently and less severely than adults, which may be explained, among other reasons, by the fact that children are hypothetically less exposed to the main transmission sources (disproportionately sharp nosocomial route) or also by the fact that, once they are less recurrently symptomatic or experience milder symptoms, they are less tested, which leads to subdiagnosis/subaccount of the real number of infected children[4-6].

The reasons invoked for this lower prevalence or symptomatic exacerbation in children are not fully known yet; some possibilities are suggested, one of them related to the fact that they tend to contract several viral infections, and that this repeated viral exposure supports the immune system as a response to SARS-CoV-2. It is also suggested that SARS-CoV-2 S protein binds to the angiotensin-converting enzyme (ACE) 2 and that children may be more protected against SARS-CoV-2, because that enzyme is less "mature" in younger ages, bearing in mind that the immune system undergoes major changes since birth to adulthood. Other hypotheses are related to the level of

inflammatory markers or even lymphocytopenia. Nonetheless and regarding this issue, there is still a lot to explore until achieving unequivocal answers[7-11].

Regarding SARS-CoV-2, different publications highlight, in particular, this minor probability of children being symptomatic or developing severe symptomatology, as well as a better prognosis regarding the incidence of infections in adults[5, 10, 12, 13].

The clinical condition is characterized by fever, cough, odynophagia, diarrhea, rhinorrhea, fatigue, vomiting, myalgia, headache, breathing difficulty and/or eating refusal; more rarely, it can cause severe disease, with pneumonia associated to sepsis, septic shock and/or acute respiratory syndrome. Most (50-80%) children with COVID-19 have an infected contact at home. The disease's morbidity and mortality seem to be related to the host's immune/inflammatory response[4, 14-18].

Recently, there have been some reports, rather incidents in some countries, with manifestations of one kind of inflammatory syndrome (*Kawasaki-like disease*), with an hypothetical link to COVID-19, with manifestations of vasculitis and cardiac dysfunction potentially associated (which may lead to aneurysm of coronary arteries), among others. The diagnosis may also include a persistent fever, exanthema, lymphadenopathy, bilateral bulbar conjunctive congestion and mucosa and extremity changes. Since the mechanisms are still unknown at present, eventually immune, underlying or giving raise to this disease, , and given the fact that it is a cross-cutting finding in all the countries going through a pandemic phase, research about this issue is still ongoing[19-21].

It should also be noted that, even though children appear to be less vulnerable to severe forms of this disease, some sub-populations are considered more susceptible of developing more severe infections, such as:

- Immunocompromised: primary immune deficiencies (except IgA deficiency) and HIV infection with low CD4 count (<200); solid organ or hematopoietic cell transplant; asplenia (anatomic or functional, including sickle cell anemia); patients under the effect of immunosuppressants (azathioprine, methotrexate, mycophenolate, cyclosporin, cyclophosphamide, tacrolimus, sirolimus, biologic

DMARDs or daily corticotherapy >28 days; it does not include hydroxychloroquine or sulfasalazine);

- Patients with heart conditions: hemodynamically significant cardiac disease, serious heart conditions subjected to an intervention recently or in a waiting list for heart transplant;
- Patients with chronic respiratory disease: cystic fibrosis, bronchopulmonary dysplasia, interstitial lung disease, severe asthma, neurological or metabolic conditions with respiratory failure;
- Others: Type 1 DM with poor metabolic control, chronic kidney disease on dialysis[15, 22].

Nonetheless, the role of children in the transmission of the novel coronavirus remains uncertain and the fact that they tend to express milder forms of COVID-19, with less typical manifestations and a potential longer incubation period, cannot mean that we should underestimate children who develop/manifest the disease[6, 12, 16, 23].

Context of the consultation of Dentistry and the need for these Clinical Guidelines

The dentists are, in countless situations, the first line of diagnosis[24]. Moreover, they represent the most exposed professional class and the one at greater risk of infection by SARS-CoV-2 since the majority of the procedures they perform imply the generation of aerosols[25].

The saliva contains a very high viral load of SARS-CoV-2 in infected patients and evidence shows that it can survive up to 9 days on surfaces and items that have come into contact with contaminated oral fluids[25, 26].

Having said that, we are going through unparalleled times, to which we have all been subjected, all over the word, as a consequence of this pandemic outbreak. Its consequences can be seen transversally in the global economy, but also deeply in the behavior of populations, highly constrained in their daily

routines and professional performance. Regarding clinical performance and dental consultation organization, the need of re-establishing new strategies and practices in an interrupt and strict way emerges, and this closely depends on the disease progress and on our level of knowledge about transmission, immunization and therapeutics. All the present uncertainties and unknowns make clinical guidelines and recommendations require updating at an unprecedented rhythm even for science itself, in terms of response capacity; therefore, pediatric dentists should base the safety of clinical practices on the most updated recommendations, always bearing in mind their dynamic pattern, but also on the desired clinical sense, whether in their individual preparation, the physical changes required in the clinical setting, in the constrained interpersonal relationship, and the type of treatment to undertake[27].

The Pre-Intervention Stages

What can caregivers do in household context?

Answer: In order to minimize the incidence of cross-infection and the increase of the epidemic spread of COVID-19, the recommendations should be directed to the parents, in a home environment. These include, not only the observance of correct and frequent hand sanitation, practicing physical exercises, as much as possible, but also reinforcement regarding good eating and hygiene habits, specially underlining the importance of good oral hygiene. The observation of the habits may help to prevent some emergency episodes, which is desirable in the present context[28-30]. *(Level III, Class I)*

Regarding emergency situations or non-urgent appointments in pediatric dentistry consultations, how should you proceed?

Answer: During the pandemic period, emergency situations in pediatric dentistry should be handled according to the present guidelines of control of COVID-19[30]. Therefore all the recommended procedures regarding the triage of scheduling of consultations/emergencies (as applicable) should comply with the general standards described in 1.1-1.5 and 2.1-2.8; we highlight the emphasis the importance that ~~which~~ teleconsultations can have in this context, to help manage the agenda, minimize the child~~ren~~'s risk of exposure and maximize the health care response, taking into account the circumstantial constraints[27, 31, 32].

Based on the assessment of the answers given in the questionnaire applied, through the phone or by email, it is possible to assess, as accurately as possible, the severity of the dental condition, assess the context specifically established for emergency treatment and make a decision, which can be a prescription, performing a face-to-face consultation or deferring the intervention[33, 34]. *(Level IV, Class IIb)*

What are the assumptions regarding the pediatric dentistry consultation?

Answer: As described in paragraphs 2.7 and 9.4, ideally the children should be taken to the consultation just by one accompanying person, except certain situations properly justified, and the steps established in 9.1-9.8 should complied with sequentially and thoroughly.

Must children also wear a mask?

Answer: Most of the times, COVID-19 among children appears to have a mild or even asymptomatic expression. Its potential contribution for the community spread of the virus should not be overlooked, therefore, and despite other behaviors to comply with the use of masks by children is recommended[16].

Concerning this issue, standards vary from one country to another: whereas in the United States CDC recommends the use of masks by children older than 2 years old in public settings, with a few exceptions; in Portugal, the most recent indication, as provided for in a decree-law, recommends the mandatory use of a mask by children older than 6 years old, also in public settings, and it makes a particularly reference to school environment[35-38].

We underline the need to instruct its correct donning and removal~~)~~, always assisted by the accompanying person (refer to paragraphs 9.3 and 9.5).

Other aspects should also be taken into account: risk of asphyxia; the tendency to touch their face more often; the need of a correct adjustment to the smaller children's face; fear/resistance to wearing a mask. To get around this last aspect, and in an attempt to demystify it, it may be useful if caregivers, beforehand, in the household environment:

- Encourage the child to look in the mirror wearing a mask and talk about it;
- Put on a mask on a puppet the child particularly likes;

- Purchase masks to be used specifically in a pediatric context: smaller, colorful and attractive;
- Show the child pictures of other children wearing a mask;
- Encourage its occasional usage in home environment so that the child gets used more easily;
- Explain briefly why it must be used, taking into account the child's age/maturity/degree of understanding, avoiding tendentious stereotypes (wearing a mask = being sick).

For children considered susceptible to the above mentioned severity, we recommend protection with a different, more effective kind of mask[15, 36]. *(Level IV, Class IIa)*

What should be observed in a clinical environment?

Answer: The cross-cutting information applicable to the clinic organization where the pediatric dentistry consultation takes place should be considered, regarding: information related to space and furniture organization (3.1-3.10), physical barriers and signaling (4.1-4.3), other useful information related to the hygiene of hands (5.1-5.4), oral cavity and other oral devices prior to the consultation (5.5), waiting room and sanitary facilities cleaning (6.1-6.12), flow of people (7.1-7.4), access to the clinic (8.1-8.4), particular aspects regarding patients and the accompanying persons (9.1-9.9), reception of providers of services to the clinic (suppliers, waste collection10.1-12.1) and protection equipment to be used by the receptionists, administrative staff and cleaning staff (13.1 e 14.1). Other details regarding the particularities of the pediatric patient should also be taken into account.

The child should remain as little time as possible in the waiting room, and preferably he/she should enter the dental office as soon as he/she arrives to the clinic. If there is a waiting time, the child should keep the mask on, remaining ideally near the accompanying person, who will be responsible for guaranteeing

the necessary social distance regarding other eventual patients also present in the room[27].

The child and, more particularly the accompanying person, should be instructed not to take toys into the consultation, once they are a potential source of contamination and cross-infection; toys should be removed from the waiting room and the dental office, for the same reasons[39, 40].

The same procedure should be adopted with objects which can be easily contaminated, but which can also easily be a source of contamination, widely used by little children (pacifiers, feeding bottle...).#*(Level IIb, Class I)*

Key Points

- The recommendations should be directed to the parents, in a home environment. These include, not only the observance of correct and frequent hand sanitation, practicing physical exercises, as much as possible, but also reinforcement regarding good eating and hygiene habits, specially underlining the importance of good oral hygiene. ***(Level III, Class I)***
- During the pandemic period, emergency situations in pediatric dentistry should be handled according to the present guidelines of control of COVID-19. ***(Level IV, Class IIb)***
- Ideally the children should be taken to the consultation just by one accompanying person. ***(Level IV, Class IIa)***
- Most of the times, COVID-19 among children appears to have a mild or even asymptomatic expression. Its potential contribution for the community spread of the virus should not be overlooked, therefore, and despite other behaviors to comply with the use of masks by children is recommended. ***(Level IV, Class IIa)***
- The child should remain as little time as possible in the waiting room, and preferably he/she should enter the dental office as soon as he/she arrives to the clinic. If there is a waiting time, the child should keep the mask on, remaining ideally near the accompanying person, who will be responsible for guaranteeing the necessary social distance regarding other eventual patients also present in the room. ***(Level IIb, Class I)***
- The child and, more particularly the accompanying person, should be instructed not to take toys into the consultation, once they are a potential source of contamination and cross-infection; toys should be removed from the waiting room and the dental office, for the same reasons. ***(Level IIb, Class I)***

The Stages of Peri-Intervention

Besides the cross-cutting applicable information regarding the definition of risk of the procedures (15.1-15.4), the preparation of the office and of personal protection (16.1-16.11), personal protective equipment (17.1-17.7), rotary instruments (19.1-19.2), there are other details to be observed regarding the pediatric patient:

In consultation environment, what should be taken into account in terms of behavior management and regarding operating procedures?

Answer: *(Level Ib, Class IIa)*

The dental office door must remain closed for the duration of procedures[27].

Whenever possible, the consultation planning should include the greatest possible number of treatments to reduce visits to the clinic[27].

The COVID-19 outbreak and mandatory confinement with the consequent reduction of outdoor activities and social interaction seems to be associated to an increase of anxiety levels and depression, also among children[41-43].

Parents' attitudes and emotions may affect the progress of the consultation and influence negatively the child's perception of the event[44].

Therefore, the accompanying person (father/mother/other) should assume, even more than usually, a crucial role in the acceptance of the additional constraints associated to the consultation in pandemic time, namely, for example, in what concerns the strictness of protocols to control the infection, the limitation of close contact with a greater impersonality in the usual contact, the devices and complexity of personal protection equipment. Preparing the child previously at home, without any alarm, explaining the reason why the environment and the consultation will temporarily be different from the familiar ones (except,

obviously, first consultation situations) may be advantageous. Watching pictures exemplifying the "new" clinical context is one of the hypothesis to take into account[45].

The type of uniform worn by the dentist, as well as his/her global appearance and communication ability, verbal and non-verbal , seems to influence the child's behavior during consultation[46-48].

Usually, the father/mother/ accompanying person remains in the office during the first dental visit; depending on the situation, this presence may be necessary, essential or discouraged, therefore it should be analyzed and properly explained[49, 50].

Nonetheless, ideally and wherever practicable without affecting patient's collaboration, the child should enter alone in the dental office. If the presence of an accompanying person reveals to be fundamental, that person should remain in the office always observing the requirements described in 9.5-9.8.

Before the child's need to be treated sitting on the accompanying person's lap, that person should be, at least, wearing a mask (or established PPE) and have been submitted to triage, as described in 9.1-9.3[27].

Some remarks, regarding operating procedures:

- Do not give priority to the scheduling of consultations dedicated to "routine" treatments during this period[51];
- Consider as urgent pediatric dentistry consultation: presence of relevant oral swelling compromising swallowing and/or breathing, causing severe trismus, severe ocular extension, with eventual associated pyrexia; complex trauma in permanent dentition (avulsion, severe luxation, complicated crown fracture, crown root fracture) and in primary dentition (pulp exposure or severe luxation); uncontrolled bleeding which has not responded to self-care measures; severe dental pain (irreversible pulpitis) which has not responded to analgesics and

is impacting on eating and sleeping. Priority should be given to children with underlying medical conditions which place them at greater risk of complications or to children with additional needs of behavioral approach (e.g. autism), such as those where pain may be having a severe impact on the child/family, with evidence of adverse behaviors such as self-harming[51, 52];

- Establish/re-establish a treatment plan taking into account the circumstantial contingencies, and complying with it as strictly as possible, enabling a better management of the subsequent consultations;
- Practice four-handed work[29];
- Aiming at minimizing aerosol generation (19.1-19.2), consider the adoption of alternative strategies compatible with less invasive approaches and, in some situations, consider even the temporization of lesions evolution. Same examples of such approaches are: carious tissue removal using manual instruments, chemo-mechanical instruments, application of cariostatic agents, remineralizing agents, fluoride releasing restorative materials , among others[27, 28, 53];
- Give priority to the use of a rubber dam in all the procedures in which that is possible and suitable (for further information refer to 18.3)[27, 54, 55];
- Consider instructing the child to mouthwash /to allow alternatively the application of a topical antimicrobial solution, according to paragraphs 18.1 and 18.2, once coronavirus seems to be vulnerable to oxidation processes due to chemical agents, such as hydrogen peroxide, alcohol, povidone-iodine and cetylpyridinium chloride. It must be kept in mind, however, the risk of refusal (flavor), of swallowing, intolerance, as well as the absence of proven indication and effectiveness in pediatric age regarding this virus;

- Some of these solutions are used in the child's oral cavity, aiming above all the control of cariogenic flora, gingival inflammation, after a tonsillectomy, in different formulations and concentrations[29, 56-64];
- Preference should be given to disposable/sterilizable tubing in case of usage of nitrous oxide sedation equipment[27];
- Choose to use paracetamol, in the usual dosage, when a prescription is needed to control pain (and fever) in a patient with suspected or confirmed COVID-19. At this stage, there is no clear evidence that ibuprofen aggravates the progress of the disease; a theoretical risk is under investigation and its usage seems not be contraindicated, even though this issue is still raised in literature. It should, however, be avoided in cases of kidney failure/dehydration[14-17];
- Avoid procedures which may cause cough and/or choking; these include intraoral imaging procedure, which, in spite of being more common, may instigate this type of reflexes, besides being a stimulus for increased salivaryproduction. For these reasons, extra-oral imaging resources have been appointed as preferential at this stage and whenever the clinical situation allows it[14, 53, 65, 66];
- Consider, together with the attending physician, the risk/benefit of the pediatric dentistry consultation, in the present pandemic context, among immunocompromised children and young people[27].

Procedures to be adopted in pediatric emergency situations in the clinical setting during pandemic period

Answer: The response before an emergency situation in this context, whether it regards pediatric basic life support maneuvers, or the response to hypothetical chocking situations, among others, has been re-adapted during this period, and therefore we recommend the careful reading of: *European Resuscitation Council COVID-19 Guidelines; Pediatric Basic and Advanced Life Support*[67].

If clinically necessary (asthma attack, for example), inhalation therapy should be administrated with a pressurized inhaler (MDI) +/- expansion chamber or dry powder inhalers; we recommend the individual use of inhalers and chambers, preferably if they are the patient's own inhalers (recommend to bring it to the pediatric dentistry consultation)[15, 68-70]. *(Level IV, Class IIa)*

Key Points

- The dental office door must remain closed for the duration of procedures. ***(Level Ib, Class IIa)***
- Whenever possible, the consultation planning should include the greatest possible number of treatments, to reduce visits to the clinic. ***(Level Ib, Class IIa).***
- The COVID-19 outbreak and mandatory confinement with the consequent reduction of outdoor activities and social interaction, seems to be associated to an increase of anxiety levels and depression, also among children. ***(Level Ib, Class IIa).***
- Aiming at minimizing aerosol generation, consider the adoption of alternative strategies compatible with less invasive approaches and, in some situations, consider even the temporization of lesions evolution. Same examples of such approaches are: carious tissue removal using manual instruments, chemo-mechanical instruments, application of cariostatic agents, reminaralizing agents, fluoride releasing restorative materials, among others. ***(Level Ib, Class IIa)***
- Give priority to the use of a rubber dam in all the procedures in which that its possible and suitable. ***(Level Ib, Class IIa)***
-

After-Intervention Stages

Regarding this topic and due to the cross-cutting character of recommendations, please refer to the following paragraphs: end of the consultation and disinfection of the dental office (20.1-20.22), materials and devices to be sent to the prosthetics laboratory (21.1-21.4), PPE removal (22.1-22.12), the patient's monitoring (23.1-23.4), patient's return to the reception (24.1-24.4), payment methods (25.1), material cleaning, disinfection and sterilization Standards (26.1-26.7) and how to proceed in the event of accidental exposure (27.1-27.2).

Conclusion

For additional information, refer to the complete document entitled *COVID-19 Clinical Guidelines - Dentistry*[1].

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eISBN | 978-989-26-2110-4
DOI | 10.14195/978-989-26-2110-4

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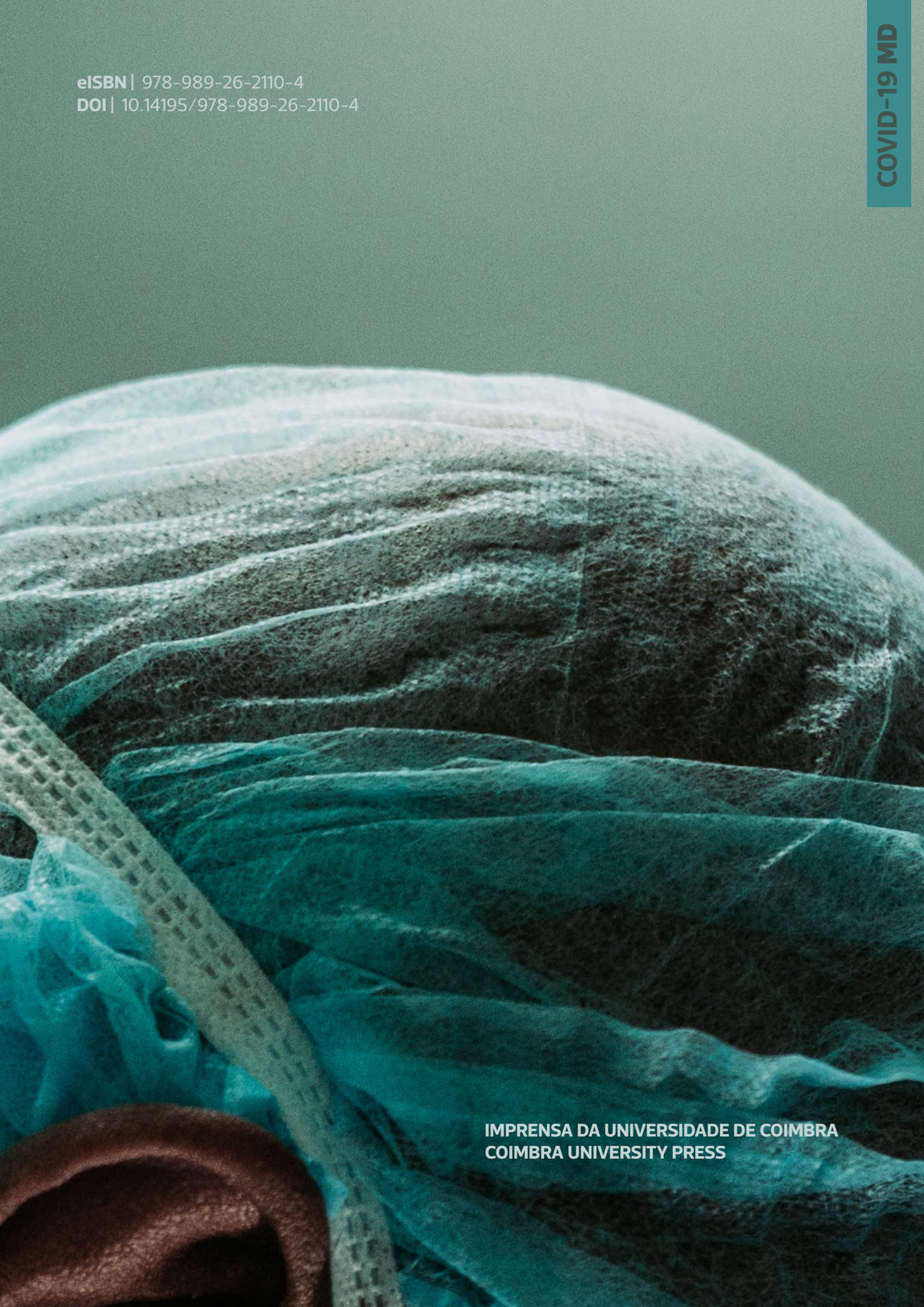

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