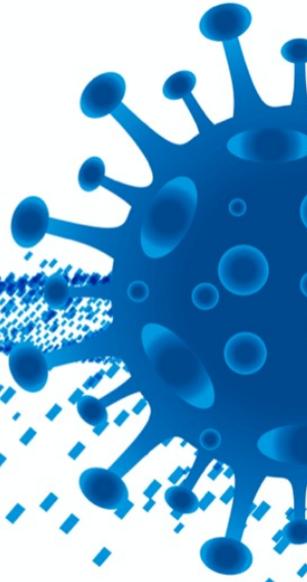


COVID-19 **MD**



COVID-19 |

Pediatric Dentistry Extension

Clinical Guidance Dentistry

| **Update**

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.

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.

The contents in this extension do not exempt from reading the full document^[1]; it completes it in what concerns the particular context of pediatric patients.

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Preliminary remark

Although a year has passed since COVID-19 was declared a global pandemic, there's still a gap in the quality of scientific evidence on this subject. An exceeding amount of COVID-19-related research articles has been published, in an attempt to fully understand this new form of coronavirus. In this context, these updated Clinical Guidelines followed the same methodology of that of the originally published document (protocol 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](https://www.nice.org.uk)^[2]).

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 and quickly spread around the world. Although to date COVID-19 has been found to have a diverse epidemiological impact on different populations, from different countries, not affecting communities in a fully predictable or transversal way. Several strategies and policies have been implemented to prevent adverse outcomes as critical care overload, medium to long-term complications or even deaths, despite uncommon among pediatric patients^[3].

The World Health Organization (WHO), the European and American Centers for Disease Control and Prevention (CDC) and modern databases keep an updated interactive epidemiologic map. In Portugal, according to the epidemiological bulletin issued by the Portuguese Health Authority (DGS), there were 411 cases of children up to nine years of age and 755 young people aged between 10 and 19 years old^[3] on the 3rd May of 2020 (at the date of redaction of the original Guidelines). Over a year after the first confirmed case in Portugal, current epidemiological data indicates approximately 45.000 confirmed cases among children aged 0-9 years and 76.000 in the 10-19 age group^[4].

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^[5-8].

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^[9-14,15].

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^[6,12,15-18]. Headache, odynophagia, myalgia, vomiting and diarrhea do not on their own indicate an infection by SARS-CoV-2, however when present they can be signs that merit clinical evaluation for suspicion of the illness. This consideration should be taken into account particularly in pediatric illnesses, in which rhinorrhea and gastrointestinal symptoms have higher prevalence. While it is rare, SARS-CoV-2 should be investigated as a multisystem inflammatory syndrome manifesting persistent fever, gastrointestinal distress, exanthema, conjunctivitis, difficult breathing, and either neurological or cardiological symptoms or both^[15].

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, including some oral and perioral features (bluish lips and oral necrotizing microvasculitis particularly in critical states of *Kawasaki-like disease*)^[18-26].

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^[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^[7,16,27,28]. In this context, early detection of children with mild symptoms or asymptomatic and timely diagnosis of *Multisystem Inflammatory Syndrome in Children* are crucial for COVID-19 management, to prevent transmission and evolution to a severe inflammatory state^[22].

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

We are going through unparalleled times, to which we have all been subjected, all over the world, 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^[29,30].

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 given during pediatric dentistry consultation 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^[31-34]. (*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^[32].

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 teleconsultations can have in this context, to help manage the agenda, minimize the child's risk of exposure and maximize the health care response, taking into account the circumstantial constraints^[29,35-40, 41].

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^[38,42,43]. (*Level IV, Class IIb*)

Additionally, triage using photographs may decrease significantly the need for attending dental clinics, therefore contributing to reduce the levels of exposure and anxiety^[44].

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 be complied with sequentially and thoroughly. Children should be prepared in advance regarding changes in the clinic environment, use of Personal Protective Equipment, limits on the number of companions in the dental office and in common areas of the dental clinic, lack of toys and minimization of physical contact^[30,34,45].

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^[27].

Concerning this issue, standards vary between different organizations and even from one country to another, particularly concerning community context, in school environment. The WHO recommends that in the case of children between the ages of 6 and 11, the decision to use a mask should be based on an approach considering the risks involved. Children and adolescents 12 years old and older should follow the same guidelines in place for adults^[46]. The European Center for Disease Prevention and Control, in its latest update, delivers the same guidelines as the WHO on this regard^[47]. Unless recommended otherwise, in Portugal, the most recent indication recommends the obligatory use of masks beginning in the second cycle (10 years of age) with the encouragement of those younger to voluntarily follow the same rule, in social and community contexts and especially in school environments^[48,49]. (*Level IV, Class IIa*)

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^[50,51]. (*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 collection 10.1-12.1) 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^{29,33,40]}.

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^[45,49,52].

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)

Parents' attitudes and emotions may affect the progress of the consultation and influence negatively the child's perception of the event^[53].

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^[34,54,55].

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^[56-59].

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^[59,60].

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^[29,34].

Some remarks, regarding operating procedures:

- Do not give priority to the scheduling of consultations dedicated to "routine" treatments during this period^[34,61];
- 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 and suspect of oral cancer. 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^[37,40,61-63];
- Practice four-handed work^[33,64];
- 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^[29,30,31,34,39,40,65,66];
- 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)^{29,33,37,67,68]};

- 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^{33,34,41,69-77};
- 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^[78].
- Extra attention should be given to the possibility of cardiac affection taking place in cases of Pediatric Multi-System Inflammatory Syndrome, and administration of prophylactic antibiotics may be needed to perform certain procedures^[23], though this indication still lacks robust evidence.

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 choking 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*^[78,79].

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)^[50,80-82]. (*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, remineralizing 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*^[1,41].

What is the current situation in regards to vaccinating children for COVID-19?

The American Academy of Pediatrics recommends that all individuals at least 16 years of age and older that meet the defined criteria should receive the COVID-19 vaccine^[83].

The trials for different vaccines are currently taking place and it is estimated that some of these may be administered to children before the end of this year. Preliminary studies indicate positive results in regards to side effects, based particularly on the recent studies performed in Israel^[84].

Current studies include children starting at 12 years of age as it is important that pediatric patients are included in trials as quickly as possible. Evidence of both safety and efficacy in children, especially in terms of immune response, is urgent to substantiate the age indication for these vaccines^[83].

Low rates of serious illness and death associated with infection by SARS-CoV-2, along with the limited data in respect to the safety of children and young people, could be one of the factors contributing to them not being prioritized for vaccination in early phases^[85].

However, specific risk groups of pediatric age patients may benefit from earlier immunization, for example those with respiratory illnesses. It may be prudent to recommend initial vaccination for those children who are older (e.g. children over 12 years of age) due to a potential higher risk of severe illness than those who are younger^[85-87].

Whether or not all children are vaccinated will depend on various factors, including the role of vaccines in transmission as well as safety, efficacy and the duration of protection provided by the available vaccines. More importantly still, it will depend on if the provided vaccines are able to slow transmission and contribute to the protection of the overall population^[85].

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