COVID-19 | Orthodontics Extension

Clinical Guidelines 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 contained in this extension do not replace the reading of the full document[1], but rather complement it in a particular way in which concerns the treatment of the pediatric patient.

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Preliminary remark

Despite the appearance of COVID-19 a year ago, there is still a gap in the quality of the scientific evidence that is published. The amount of information in this area is excessive, in a desperate attempt to find answers to a virus that is still so unknown to us. As such, this update followed the methodology of the initially published NOC (protocol provided 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]).

Introduction

Consolidation of scientific evidence that SARS-CoV-2 also affects children and teenagers. Evidence that, given the context, the use of clear aligners may be preferable to conventional fixed treatment.

COVID-19 has been reported to be detected in asymptomatic patients and children, the majority of patients in pediatric and orthodontic clinics who place orthodontists and pediatric dentists at great risk[3].

The use of aligners is preferable to fixed treatment with the following advantages: less control visits, monitoring, and greater precision in treatment planning by digital means, better control of the plaque and less iatrogenic effects as white lesions and root resorption[4].

The Stages of Pre-Intervention

UPDATE OF THE EVIDENCE THAT SUPPORTS THE QUESTION, WITHOUT CHANGING THE LEVEL AND CLASS OF THE RECOMMENDATION

How should we reorganize the process of scheduling orthodontics consultations?

Answer: Concerning the orthodontics consultation, it is advisable the development of internal scheduling norms between the orthodontist and his/her team that fitt the type of procedure to be performed on every patient. Invariably, the required consultation time in this pandemic period is necessarily longer than what was predetermined before. This way, the number of patients that can be treated daily will necessarily be smaller. The adequate amount of time required for each orthodontic procedure (i.e., placement of fixed braces, placement of removable appliances, removal of braces and placement of retainers; follow-up visits to check on the fixed braces; follow-up visits to check on the removable braces, follow-up visits to check on the aligners, etc) must be predetermined in order to expedite and facilitate the scheduling of consultations, complying with the standards of infection control in this pandemic phase.

Since aerosol generation is not frequent at the orthodontics consultation, most critical procedures, like the placement and removal of braces, may be schedule at end of the morning or late afternoon, allowing for a longer break period of the office after consultation, allowing a greater effectiveness in the decontamination and aeration of the physical space. **However, the aerosols produced during the removal of the orthodontic appliance lead to the release of particles essentially located near the patient, operator and assistant. The removal of the composite with a low rotation "handpiece", without water, with surgical aspiration does not produce contamination by wide dispersion, and these aerosols are also circumscribed**[5-20]. *(Level III, Class IIa)*

UPDATE OF THE EVIDENCE THAT SUPPORTS THE QUESTION, WITHOUT CHANGING THE LEVEL AND CLASS OF THE RECOMMENDATION

Which protocols must be guaranteed in order to benefit from the consultation in the form of telemedicine/virtual orthodontics?

Answer: During the pandemic phase, there might be some retraction, by some patients, when it comes to schedule a dentistry appointment in general, as well as a orthodontics consultation in particular. Thus, resorting to teleconsulting may be an alternative in the schedule management, minimizing the patient's risk of exposure in the physical space of the consultation and maximizing the physician's response capacity, bearing in mind, however, the constraints inherent to this type of consultation[4, 21-23].

Portugal has more than 9 million cell phone users, representing 96,5% of the Portuguese aged 10 or more (2018). Of these, 7,2 million use internet in their cell phones (2018), resorting to any form of social media to contact their family, friends and acquaintances[24, 25].

The virtual orthodontic assistance can be carried out by photos or videos sent by the patient or by videocall. There are several platforms/applications which allow these virtual consultations and, therefore, must be assessed by every clinical unit. The dissemination of instant messaging applications like Whatsapp Messenger, Telegram Messenger or Snapchat, among users of every age as a way of virtual contact in every aspect of life, has also allowed their use in the health sector, making communication and long distance relationship possible, namely, between patients and the orthodontist, without the need for presential consultations. The use of videoconference systems allows real-time image sharing between the physician and the patient, also enabling the immediate clarification of questions raised by the patient or his/her parents, in case he/she is underage[18].

The orthodontists and the elements who compose the clinical team must be trained in the use of the modern systems of communication based on the web, with acuteness concerning the assessment of their instructions and counter-instructions[26].
Additionally, due to data protection, the transfer of personal files may require the installation of applications that guarantee the confidentiality in their transmission (text, images and videos) and that are only accessible after authorization by the administrator by login or sign-on[27-29].

The physician must implement a health database in dentistry/orthodontics that provides support to the clinical decisions through digital media by setting up strict protocols, such as [30-34]: *(Level Ib, Class I)*

- Obtain the informed consent and the proper documentation;
- •Patients must have the option to establish contact via e-mail in case they do not feel comfortable or are unable to carry out virtual consultations; or only via audio in case they opt for not using visual media;
- Choose the appropriate time, during working hours, to contact patients;
- Send all the financial information via e-mail as a piece of evidence;
- Keep the consultation formal, carrying it out in a professional environment, wearing a professional outfit.

The Stages of Peri-Intervention

UPDATE OF THE EVIDENCE THAT SUPPORTS THE QUESTION, WITHOUT CHANGING THE LEVEL AND CLASS OF THE RECOMMENDATION

Which type of PPE must be worn in an orthodontics consultation?

Answer: The PPE must be adapted to the type of clinical procedure. These can be generically divided into moderate risk interventions, where, due to their nature, aerosol generation is not expected, and high-risk interventions, where there is aerosol generation[22, 35, 36]. **Procedures such as the removal of orthodontic composite and the enamel cleaning after the removal of the appliance increase the microbiological load and the production of aerosols. High-speed instruments that use air/water also produce more aerosols**[23, 37-39]. *(Level IV, Class IIb)*

UPDATE OF THE EVIDENCE THAT SUPPORTS THE QUESTION, WITHOUT CHANGING THE LEVEL AND CLASS OF THE RECOMMENDATION

What should the course of action regarding urgent situations or non--urgent appointments in orthodontics consultation be like?

Answer: During the epidemic period, the urgent situations in orthodontics must be addressed according to the regulations of control of the SARS-CoV-2 pandemic, and the first approach must be taken remotely. Every supplied advice must be recorded and guidance must be provided to the patients on how to manage minor emergencies at home. There are, however, several scenarios where you cannot leave a patient unassisted for a period longer than 10-12 weeks. The emergencies are manifold, the patient or his/her parents must send photographs or videos in order to enlighten the physician about the problem. It should be noted that the goal is to avoid urgent situations and not their treatment[3, 40].

Removable appliance

If a removable brace is fractured or if the patient presents any discomfort while wearing it, we suggest the suspension of its use, in order to reduce the number of

urgencies that cannot be immediately managed and the orthodontist must be contacted as soon as possible.

In case of fracture or loss of the aligners in use, the patient must wear either the previous or the following aligner, depending on the usage time of the broken/lost aligner.

In the event of a fracture or loss of the retainer which interferes with the stability of the treatment, we suggest the use of thermo-moldable plates easily found on e-commerce addresses or dedicated places, until the scheduling of an appointment to make a retainer replacement.

Fixed appliance

- Lip or jugal mucosa irritation caused by orthodontic braces:
    - Applying orthodontic wax or silicone on the bracket or the wire which is causing the irritation;
    - The orthodontic wax which may be accidentally swallowed is harmless;
    - The lesions on the mucosa or gum can be soothed by using a piece of cotton soaked in a small amount of topical anesthetic, applied daily on the ulcerated surface. There may be the need to further applications.
- Elastic ligature tie become detached from the bracket:
    - During the brushing or while eating, the bracket's ligature tie may get loose;
    - The ligature tie may be placed back again with sterilized tweezers around the whole bracket's structure;
    - • In case the patient is unable to reposition the ligature tie, it can be removed using sterilized tweezers.
- Metallic ligature tie become detached from the bracket, or irritating the lips or the jugal mucosa:
    - If the ligature tie is loose, use sterilized tweezers to remove it;
    - • If the ligature tie is not loose, but if it is irritating the mucosa, use a cotton swab or the eraser at the end of a pencil to bend it.
- Loose or broken elastic chain:
    - Remove this segment of the elastic chain with sterilized tweezers or cut it with a sterilized cutting instrument (i.e. nail plier, nail clipper).
- Loose orthodontic component (bracket, tube or band):

- In case a bracket is loose but kept in position, it can be left as it is. If, on the other hand, it moves, the patient or his/her parents can remove it with sterilized tweezers;
- In case the loose bracket is the support of intermaxillary rubber bands, their use must be interrupted;
- If the last element of the braces is detached, it can be moved, by making it slide along the arch, in case the caregiver manages to perform it safely and there is no distal bending. Alternatively, the patient can cut the arch at the last fixed element using a sterilized nail plier or nail clipper, removing the detached adjacent structure.

- Protruding arch at the end of the fixed braces:
  - • Using a cotton swab or the eraser at the end of a pencil, push the arch in order to flatten it against the tooth. If that is not possible, we can recommend the orthodontic wax as a protection;
  - Sometimes, the arch is protruding at one of its ends after having slid all along the braces. Should this happen, you must encourage the patient to reposition the arch making use of sterilized tweezers, so that it is steady and comfortable on both sides;
  - In case the arch is irritating the oral mucosa, you must ask the patient to cut the excess of arch with a sterilized cutting instrument, like a nail plier or a nail clipper. At this point, the caregiver must put a gauze all around that area in order to reduce the possibility that the patient swallows the excess of cut-off arch. It may also prove necessary to apply orthodontic wax to provide comfort to the irritated area.
- Swallowed braces' element or bracket:
  - Most orthodontic elements of small dimension, like brackets, when swallowed, pass through the digestive tract with no complications;
  - • If an element has been swallowed, you must confirm whether the patient has had trouble breathing or cough suddenly after swallowing the object. In the event of a sudden shortness of breath or cough after swallowing it, the patient must head for the emergency room, where a clinical and radiographic assessment is advised.
- Traumatic injury to the gum caused by the orthodontic wire which causes intense pain/infection:

- Using a sterilized cutting instrument, cut the portion of the arch and remove it using sterilized tweezers. In case you suspect of a periodontal abscess, an urgent consultation must be scheduled in order to rule out the causal factor. If that proves impossible, you must prescribe an anti-inflammatory/analgesic and, when necessary, antibiotic therapy.

Other situations:

- Fractured fixed retainer:
  - If the whole fixed retainer is detached, it must be removed by the patient. When possible, the patient must wear his/her removable retainer;
  - If the retainer is loose in only one or two dental pieces, the patient can:
    - Try and push the arch so it contacts with the teeth, in the area where the retainer is not glued;
    - Cut the unglued portion using a sterilized cutting instrument;
  - If only a small portion of the retainer is adhered, use sterilized tweezers to remove all of it. If that proves impossible, the retainer must be cut off, leaving the portion still glued in the mouth.
- Fractured or detached fixed expander, lingual or palatal arch:
  - If the expander, lingual arch or palatal bar is partially adhered and still present in the mouth, it must be put back in its correct position and the activations must be interrupted;
  - In case the device has entirely come out, it must be kept for subsequent placement, if needed.
- Fractured mandibular propulsion appliance:
  - If the device is completely fractured and the shaft cannot be placed in the spring, the loose portion must be removed.
- Fixed/removable appliances activated at home (i.e. face mask, extra-oral traction, quad-helix, hyrax, pendulum…):
  - As prevention, the suspension of their use/activation is recommended until a presential consultation is scheduled, in order to avoid a possible emergency;
  - Alternatively, the patient may send the orthodontist images showing the progress of the treatment at given times, depending on the mechano-therapy in question[26, 41-45].

(Level IIa, Class I)

The Stages of Post-Intervention

UPDATE OF THE EVIDENCE THAT SUPPORTS THE QUESTION, WITHOUT CHANGING THE LEVEL AND CLASS OF THE RECOMMENDATION

Which procedure should be adopted in the sterilization of the orthodontic cutting pliers?

Answer: The orthodontic pliers can be sterilized by autoclaving, dry heat, chemical vapor or ethylene oxide. As far as the pliers containing plastic elements are concerned, the sterilization by ethylene oxide is the only method considered to be effective. However, this method implies very long procedures and it is more costly. The sterilization of orthodontic ligature tie cutting pliers made of stainless steel does not present significant differences when performed by autoclaving or by dry heat. Therefore, the autoclave, the most commonly used method of sterilization in dental clinics, can be used without any significant negative effects to this type of pliers.

After used, the plier must be washed, disinfected, dried and lubricated in the articulation areas, then put into sleeves and sterilized. While cleaning manually, it must not rubbed with hard objects, since they might destroy the instrument's surface and increase the risk of oxidation. When cleaning it with a thermal disinfection equipment, you must use a neutral pH enzymatic detergent, but when cleaning manually, we recommend the use of a neutral or mild alkaline detergent (between pH 7 and 10).

The ultrasound cleaning equipment requires the chemical disinfectants to be mixed according to the manufacturer's instructions and prepared on a daily basis in order to avoid undesired effects induced by evaporation and contamination. The immersion in ultrasound tanks cannot exceed the maximum treatment time nor the temperature recommended by the manufacturer (for instance, you must never leave the instruments in the bath overnight or over the weekend, nor allow the temperature to exceed 25°C).

In the treatment prior to the placement in sterilization sleeves, the pliers must be lubricated, by applying oil specific for these instruments, in the articulation areas and in other critical points, like the blade, spring or hard metal cutting inserts – tungsten carbide, and they must be opened and closed multiple times. When you put the pliers in sleeves, these must have their shafts fully open.

Sterilization by autoclaving is typically performed at 134ºC, lower than that mentioned by some manufacturers, 180ºC, at which point, softening effects of the cutting areas may start to occur [39, 46-51]. *(Level IIa, Class IIa)*

UPDATE OF THE EVIDENCE THAT SUPPORTS THE QUESTION, WITHOUT CHANGING THE LEVEL AND CLASS OF THE RECOMMENDATION

What care should you have for the other instruments and specific orthodontic material in order to reduce the risk of nosocomial infection?

Answer: **Orthodontic bands –** The bands that have already been tried on in the mouth, but that have not been used, must be disinfected and sterilized by autoclaving[39, 41, 42, 52].

Brackets' positioning star – If the device is metallic, it must be cleaned with a dressing soaked in alcohol at 70%, although you should preferably use disposable devices[41, 42, 52].

Steel wires, arches, brackets and portions of orthodontic braces removed from the mouth – they should be treated as infected material and disposed of[41, 42, 52].

Mini-implant – The majority of manufacturers already sell the mini-implants in sterilized individual sachets. Otherwise, you must always follow the manufacturer's recommendations to ensure effectiveness of the sterilization process.

The mini-implants must not be retrieved, since they may suffer alterations to their surface characteristics. Therefore, their reuse is not recommendable, since there is not enough scientific evidence on a series of variables which may affect their resistance to fracture[53, 54].

Lip retractors – Their washing and disinfection must be performed in an ultrasound tank filled with a disinfectant solution, followed by sterilization in autoclaved inside sleeves afterwards [41, 42, 52] . *(Level IIa, Class IIa)*

Conclusion

For further information, please refer to the full document titled *COVID-19. Clinical Guidelines - Dentistry*[1].

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