

Risk of transmission and special care in urgent and emergency oral and maxillofacial surgery – COVID-19**Risco de transmissão e cuidados especiais em cirurgia oral e maxilofacial de urgência e emergência - COVID-19**

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ABSTRACT

The routes of transmission of Coronavirus disease 2019 (COVID-19) still need to be better identified; however, human-to-human transmission is already a reality in many countries. This study aims to gather recommendations from health agencies and studies published in scientific articles related to special procedures for oral and maxillofacial surgeons in the perioperative period of urgency and emergency. The possibility of cross infection by inhalation of particles produced during surgical procedures justifies the study. This study assesses the COVID-19 routes of transmission and the possibility of cross-contamination through droplets of saliva transformed into aerosols. We consider that when the oral and maxillofacial surgeon adopts special procedures in the perioperative period, it may help prevent the virus transmission in both professionals and patients.

Keywords: Coronavirus disease 2019 (COVID-19), Perioperative Care, Aerosol, Infection Control.

RESUMO

As vias de transmissão da Doença por Coronavírus 2019 (COVID-19) ainda precisam ser melhor identificadas; no entanto, a transmissão de pessoa para pessoa já é uma realidade em muitos países. Este estudo tem como objetivo reunir recomendações de órgãos de saúde e estudos publicados em artigos científicos relacionados a procedimentos especiais para cirurgias bucomaxilofaciais no período perioperatório de urgência e emergência. A possibilidade de infecção cruzada por inalação de partículas produzidas durante procedimentos cirúrgicos justifica o estudo. Este estudo avalia as rotas de transmissão do COVID-19 e a possibilidade de contaminação cruzada por meio de gotículas de saliva transformadas em aerossóis. Consideramos que quando o cirurgião bucomaxilofacial adota procedimentos especiais no período perioperatório, isso pode auxiliar na prevenção da transmissão do vírus tanto no profissional quanto no paciente.

Palavras-chave: doença coronavírus 2019 (COVID-19), cuidados perioperatórios, aerossol, controle de infecção.

1 INTRODUCTION

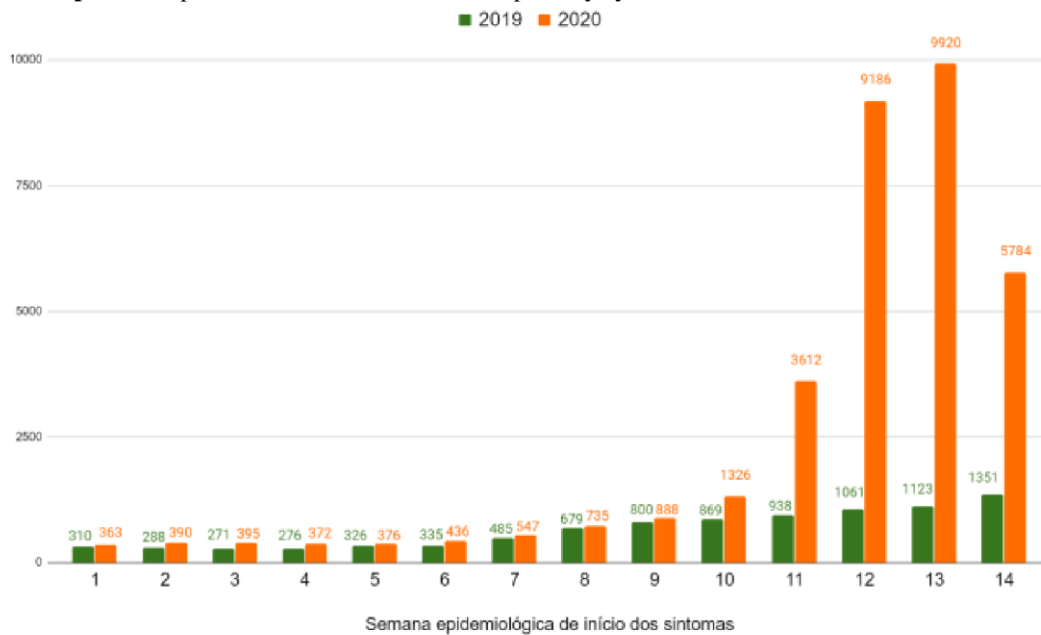
A new coronavirus has been identified as the etiologic agent of an outbreak of pneumonia in China with person-to-person transmission and subsequent internationalization of cases¹. The virus was initially named novel coronavirus (2019-nCoV), and then it was officially named severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), one of the three types of zoonotic coronavirus that caused severe acute respiratory syndrome (SARS), followed by Middle East respiratory syndrome—coronavirus (MERS)².

The Coronavirus disease 2019 (COVID-19) routes of transmission still need to be better identified; however, many countries have confirmed human-to-human transmission³. It is believed

that interpersonal transmission occurs mainly by respiratory droplets expelled when speaking, coughing, or sneezing or by direct contact with infected people via aerosols⁴.

Recently, researchers have identified coronavirus in the saliva of infected patients³⁻⁶. Studies and reports examined the oral cavity of infected patients and identified a large amount of SARS-CoV-2 RNA in the saliva, suggesting that coronavirus may be transmitted by oral droplets^{6,7}.

Graph 1: Hospitalization for severe acute respiratory syndrome in Brazil in 2019 and 2020



Source: Ministério da Saúde, updated on April 8, 2020.

The Ministry of Health¹, the agency responsible for administering and maintaining the public health in Brazil, presented the virus epidemiological data by comparing hospitalization rates from 2019 to 2020. Graph 1 shows that on days 1 and 2, there were few hospitalizations. However, there was a higher rate of hospitalization of on day 13 (9,920 people).

This study aims to gather recommendations from health agencies and studies published in scientific articles related to special procedures for oral and maxillofacial surgeons in the perioperative period of urgency and emergency. The possibility of cross infection with the inhalation of particles produced during surgical procedures justifies the study^{3,8,9}. We consider that when oral and maxillofacial surgeons adopt special procedures in the perioperative period, their safety during the procedure may increase.

¹ Ministry of Health is based in Brasilia, Brazil. Available at: <https://saude.gov.br/>

2 MATERIALS AND METHODS

Recommendations were provided by the Brazilian College of Oral and Maxillofacial Surgery and Traumatology (Colégio Brasileiro de Cirurgia e Traumatologia Buco-Maxilo-Facial), Ministry of Health of Brazil, World Health Organization (WHO), National Health Surveillance Agency (ANVISA), American Organization of Craniomaxillofacial (AO CMF), American Association of Oral and Maxillofacial Surgeons (AAOMS), Brazilian Federal Council of Dentistry (CFO), and Brazilian Society of Intensive Care (AMIB). Additionally, we analyzed scientific studies on the virus amount of RNA found in saliva and clinical cases of patients who underwent surgical procedures during the COVID-19 outbreak, which were obtained from the bulletin issued by Hospital Israelita Albert Einstein. Both contributed to this study.

This study assesses the COVID-19 routes of transmission and the possibility of cross contamination through droplets of saliva in hospital environments during the perioperative period in urgent and emergency oral and maxillofacial surgeries.

3 ROUTES OF TRANSMISSION AND RISK OF CROSS-CONTAMINATION

Particles can follow different routes of transmission during a surgical procedure. The saliva droplets reach shorter distances and fall quickly to the ground due to the gravitational force, requiring greater proximity between individuals. However, particles generated by aerosol can travel greater distances⁴.

Was conducted studies based on viral RNA extracted from saliva and supernatant from throat cleaning and then subjected to quantitative real-time RT-PCR. The amount of SARS-CoV RNA in throat cleaning was 9.58×10^2 to 5.93×10^6 copies per mL (median 3.56×10^3 copies/mL). SARS-CoV RNA was also detected in the saliva of all 14 of the samples available. The study showed large amounts of virus RNA in throat cleaning. This finding supports the idea that SARS-CoV may be transmitted via oral droplets⁷.

Was studied on 12 patients with COVID-19 in the city of Hong Kong. Saliva samples of 11 infected patients had coronavirus (91.7%); thus, showing the presence of viral RNA in the saliva⁵. Was stated that the virus can be detected in self-collected saliva of most infected patients, even if they are not nasopharyngeal aspirates¹⁰.

Patients who cough, sneeze, or receive dental treatment, including the use of a high-speed dental drill or ultrasonic instruments, allow their secretions, such as saliva or blood, to aerosolize (MENG et. al., 2020). Inhalation of these aerosol particles produced by patients with COVID-19 causes a high risk of cross infection between dental surgeons and patients^{3,4,8,9}.

Was detected the SARS-CoV RNA in the plasma of patients with SARS, although it is a respiratory disease. The first report published on April 10, 2003 indicated extremely low concentrations of viral RNA in the plasma of a SARS patient during the acute phase of the disease, nine days after the onset of symptoms. Researchers detected the SARS-CoV RNA using an internally established nested PCR test and the viral load was 190 copies/mL; the test was performed after ultracentrifugation of 2 mL plasma¹¹.

During a hospital oral and maxillofacial procedure, several surfaces can harbor contaminated particles, as the virus can survive on surfaces for up to nine days¹². If these surfaces are not effectively decontaminated, the virus transmissibility becomes an aggravating factor throughout the perioperative period; thus, representing a source of exposure for health professionals¹³.

4 PERIOPERATIVE CARE IN ORAL AND MAXILLOFACIAL SURGERY

Maxillofacial fractures are among the most common causes of visits to emergency departments¹⁴. In such cases, immediate treatment is essential and the surgeon must pay attention to perioperative care.

Hospital Israelita Albert Einstein² prepared a bulletin based on four clinical cases of patients who underwent surgical procedures during the COVID-19 outbreak and had postoperative complications. Among them, three patients developed postoperative fever and pulmonary complications after elective surgeries without complications. Correct diagnosis and treatment in the postoperative period were challenging and two patients died. Several options are available for differential diagnosis in patients with postoperative pulmonary symptoms. However, in the current progressive outbreak, professionals must suspect COVID-19 to make a correct diagnosis and take the right actions for treating the patient and preventing the virus from spreading.

COVID-19 can complicate the perioperative course with a diagnostic challenge and a high potential mortality rate, especially when the patient is asymptomatic. Special care during oral and maxillofacial surgeries may help to address the risk of cross transmission, principally in asymptomatic patients.

5 CARE DURING PERIOPERATIVE PROCEDURES IN ORAL AND MAXILLOFACIAL SURGERIES OF URGENCY AND EMERGENCY

In view of the epidemiological profile of coronavirus, as a precautionary measure, asymptomatic patients should be considered as suspects with infection, unless they have had two

² Hospital Israelita Albert Einstein is based in São Paulo, Brazil. Available at: <https://www.einstein.br/Pages/Home.aspx>

negative COVID-19 tests within a time span of at least 24 hours due to the possibility of false-negative results¹⁵. Patients who test positive for COVID-19 or show symptoms of acute infections, active pathologies, or oral and maxillofacial injuries should be treated in reference hospitals or clinics¹⁵.

Table 1 was created based on ANVISA's recommendations in association with the Brazilian Council of Dentistry (CFO), Brazilian College of Oral and Maxillofacial Surgery and Trauma, and the Association of Brazilian Intensive Medicine (AMIB), together with CFO, AAOMS and AO CMF. It describes precautions for urgent and emergency situations in patients with or without suspicion for COVID-19, in addition to confirmed patients.

Table 1: Special care for surgical procedures to reduce the risk of contagion

Period	Procedures	Practices adopted
Preoperative	Observe the possibility of early discharge and discuss if the surgical procedure is really necessary ¹⁵	Extend non-functional procedures, prioritizing cases with potential infection and those that compromise the airway ^{16,17}
ICU or beds	Assess the need for ICU bed and bed use in the postoperative period ^{16,17}	Avoid companions in the nursing ward. Limit the number of helpers and employees. PPE and adequate training for the team ^{15,17}
Surgical dressing	Precautions with aerosol procedures, using a respiratory protection mask (particulate respirator) with minimum efficiency, in the filtration, of 95% of particles up to 0.3 μ (type N95, N99, N100, FFP2, or FFP3) ¹⁵	Use of PPE, such as surgical mask, gloves, non-sterile apron, and goggles. A surgical mask should be worn for individual protection, while observing proper placement ¹⁵⁻¹⁹
Moments before starting the surgery	Based on the operating room air exchange and experiences in China and Italy, the air is free of pathogens between 14 and 20 minutes after the patient's intubation ¹⁵	The team should wait for 20 minutes outside the operating room after the patient's intubation ¹⁵
Surgical access	Whenever possible, opt for closed surgical procedures, if it is not possible to prioritize extra-oral access due to the possibility of decreasing oral aerosol ^{15,17}	Use the cold scalpel ^{15,17,19}
Osteotomy	Procedures that require bone wear must be performed without or with limited irrigation ^{15,19}	Use chisels and hammer ^{15,19}
Blocking and fixation of fractures	Professionals should perform reduction and fixation of fractures in the least traumatic way possible, minimizing the use of perforators that produce aerosols ¹⁵	Use less-invasive techniques, such as the maxillomandibular block with self-drilling IMF screws. If internal fixation is strictly necessary to stabilize the reduction, prioritize the self-drilling screws ¹⁵
Irrigation	It should only be performed when it is really necessary, being limited ^{15,17,19}	Use of PPE, such as surgical mask, gloves, non-sterile apron, and goggles. A surgical mask should be worn for individual

		protection, while observing proper placement ¹⁵⁻¹⁹
Aspiration	Saliva aspiration should be performed; however, avoid repeated aspirations ^{15,17,19}	Use of PPE, such as surgical mask, gloves, non-sterile apron, and goggles. A surgical mask should be worn for individual protection, while observing proper placement ¹⁵⁻¹⁹

Table 1 is designed to assist in practical situations of oral and maxillofacial surgeries. It aims to show the most indicated special procedures that the surgeon should follow during the perioperative period in accordance with the health agency's recommendations.

The Table shows the adopted procedures and practices related to each situation. In the preoperative period, professionals must analyze if it is really necessary to perform the procedure, as the recommendation is that non-functional procedures should be extended to avoid unnecessary risk of virus transmission. All surgical dressings must be used even with no signs and symptoms of coronavirus in the patient to prevent the virus transmission as well as transmission of other microorganisms¹⁵.

The processes that allow sputum aerosolization in infected and potentially infected people in the perioperative environment represent a possible source of exposure for health professionals. Direct contact with respiratory droplets during airway management, for nurse anesthetists and intensivists, is the period that represents the greatest risk of exposure, especially during intubation and extubation¹³. The recommendation is that the surgery team should stay out of the room for at least 20 minutes so that the air is free of pathogens after the patient's intubation¹⁵.

During surgical access, an approach with the best access should be performed considering the current scenario. Surgeons are advised to use a cold scalpel and perform a closed procedure. Whenever possible, surgeons should always opt for extra-oral access, as the oral cavity contains fluids such as saliva with a high viral load^{15,17}.

During osteotomy, professionals use instruments with a cooling system, which generates aerosols and can lead to cross-contamination between the patient and the surgeon. Therefore, it is recommended to use instruments without irrigation or with limited irrigation and replace the chisels whenever possible. In cases of fractures, the recommendation is that reduction and fixation should be performed in the least traumatic way possible, and the use of perforators producing aerosols should be minimized¹⁵.

Irrigation should be performed only when necessary, avoiding the generation of aerosols associated with instruments¹⁵. In addition, repetitive aspirations should be frequently¹⁷.

6 FINAL CONSIDERATIONS

Oral and maxillofacial surgeons should adopt preventive measures and should be careful in the perioperative period of patients in urgent and emergency situations at the health service. By following the recommendations, the intention is to reduce virus cross transmissibility, thus preventing its spread. The surgical stage requires greater attention because it is the period during which the surgeon has greatest contact with bodily fluids. In some cases, patients affected by COVID-19 do not show any symptoms; however, special procedures are not restricted to confirmed or suspected patients, but to everyone admitted to the health service in the critical period of COVID-19.

7 CONFLICTS OF INTEREST

The authors declare that they do not have any conflicts of interest to declare in relation to the publication of this document.

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