

## ORAL MANIFESTATIONS AND INJURIES RELATED TO COVID-19: AN EXPERIENCE REPORT ON THE ROLE OF HOSPITAL DENTISTRY

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**ABSTRACT:** SARS-COV-2 is transmitted among human beings by saliva droplets that come in direct contact with the oral cavity, nose, and eyes. Since the mouth is one of the anatomical sites primarily contaminated, oral manifestations have also been reported beyond the serious consequences inherent to progressive respiratory failure. This study aimed to identify oral manifestations possibly related to the infection by COVID-19 in hospitalized patients. A prospective study was carried out with patients diagnosed with COVID-19 in the period between March and June 2021, admitted to the Moderate COVID-19 Care Unit of the Hans Dieter Schmidt Regional Hospital, by applying a form and performing a clinical exam of the oral cavity. Out of all patients (n=45), 33.3% reported both olfactory (anosmia) and taste dysfunction (dysgeusia), with an average duration of  $5.9 \pm 3.0$  days. Regarding other oral manifestations evaluated, two patients reported dry and burning mouth and one patient reported a change in taste associated with plaque-like changes in the tongue. No patients presented ulcers or other lesions in the oral cavity. Olfactory and taste dysfunction were symptoms recognized of the novel coronavirus disease (COVID-19). However, the association with other oral manifestations is still controversy. Unfortunately, dentistry professionals are still not part of most teams in the hospital environment, mostly because of the lack of prioritization of dental care. Working with a multidisciplinary team may avoid possible systemic complications due to poor dental care.

**KEYWORDS:** Dental Service; Hospital; SARS-CoV-2; Anosmia; Dysgeusia.

### MANIFESTAÇÕES ORAIS E LESÕES RELACIONADAS À COVID-19: UM RELATÓRIO DE EXPERIÊNCIA SOBRE O PAPEL DA ODONTOLOGIA HOSPITALAR

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**RESUMO:** Sars-COV-2 é transmitida entre os seres humanos por gotículas de saliva que entram em contato direto com a cavidade oral, nariz e olhos. Uma vez que a boca é um dos sítios anatômicos principalmente contaminados, as manifestações orais também foram relatadas para além das graves consequências inerentes à insuficiência respiratória progressiva. Este estudo teve como objetivo identificar manifestações orais possivelmente relacionadas à infecção por Covid-19 em pacientes hospitalizados. Foi realizado um estudo prospectivo com pacientes diagnosticados com Covid-19 no período entre março e junho de 2021, internados na Unidade de Atendimento Moderado contra a Covid-19 do Hospital Regional Hans Dieter Schmidt, aplicando um formulário e realizando um exame clínico da cavidade oral. De todos os pacientes (n=45), 33,3% relataram disfunção olfativa (anosmia) e gustativa (disgeusia), com duração média de 5,9 ±3,0 dias. Em relação a outras manifestações orais avaliadas, dois pacientes relataram boca seca e ardente e um paciente relatou alteração no paladar associada a alterações semelhantes a placas na língua. Nenhum paciente apresentou úlceras ou outras lesões na cavidade oral. Disfunção olfativa e gustativa foram sintomas reconhecidos do novo coronavírus (Covid-19). No entanto, a associação com outras manifestações orais ainda é controversa. Infelizmente, os profissionais de odontologia ainda não fazem parte da maioria das equipes do ambiente hospitalar, principalmente por causa da falta de priorização dos cuidados odontológicos. Trabalhar com uma equipe multidisciplinar pode evitar possíveis complicações sistêmicas devido a cuidados odontológicos deficientes.

**PALAVRAS-CHAVE:** Serviço Odontológico; Hospital; Sars-CoV-2; Anosmia; Disgeusia.

### **MANIFESTACIONES ORALES Y LESIONES RELACIONADAS CON COVID-19: UN INFORME DE EXPERIENCIA SOBRE EL PAPEL DE LA ODONTOLOGÍA HOSPITALARIA**

**RESUMEN:** SARS-COV-2 se transmite entre los seres humanos por las gotitas de saliva que entran en contacto directo con la cavidad oral, la nariz y los ojos. Dado que la boca es uno de los sitios anatómicos principalmente contaminados, también se han informado manifestaciones orales más allá de las consecuencias graves inherentes a la insuficiencia respiratoria progresiva. El objetivo de este estudio fue identificar las manifestaciones bucales posiblemente relacionadas con la infección por COVID-19 en pacientes hospitalizados. Se realizó un estudio prospectivo con pacientes diagnosticados de COVID-19 en el periodo comprendido entre marzo y junio de 2021, ingresados en la Unidad de Cuidados Moderados de COVID-19 del Hospital Regional Hans Dieter Schmidt, mediante la aplicación de un formulario y la realización de un examen clínico de la cavidad oral. De todos los pacientes (n=45), el 33,3% notificó tanto disfunción olfativa (anosmia) como gustativa (disgeusia), con una duración media de 5,9 ±3,0 días. En cuanto a las demás manifestaciones orales evaluadas, dos pacientes notificaron sequedad y ardor de boca y un paciente notificó un cambio en el gusto asociado a cambios en la lengua en forma de placa. Ningún paciente presentó úlceras u otras lesiones en la cavidad oral. La disfunción olfativa y gustativa fueron síntomas reconocidos de la nueva enfermedad por coronavirus (COVID-19). Sin embargo, la asociación con otras manifestaciones orales es aún controvertida. Desafortunadamente, los profesionales de la odontología todavía no son parte de la mayoría de los equipos en el entorno hospitalario, principalmente debido a la falta de priorización de la atención odontológica. Trabajar con un equipo multidisciplinario puede evitar posibles complicaciones sistémicas debido a la mala atención dental.

**PALABRAS CLAVE:** Servicio Dental; Hospital; SARS-CoV-2; Anosmia; Disgeusia.

## 1. INTRODUCTION

COVID-19 was declared a pandemic by the World Health Organization (WHO) on March 11th, 2020, with 118.319 confirmed cases and 4.292 registered deaths (WORLD HEALTH ORGANIZATION, 2020a). As of February 14th, 2021, there were 108.246.992 cases and 2.386.717 deaths worldwide (WORLD HEALTH ORGANIZATION, 2021). After approximately two years of pandemic, the world situation on February 8th, 2022, was of 392.145.701 cases and 5.724.353 deaths (WORLD HEALTH ORGANIZATION, 2022).

Brazil had its first confirmed case of COVID-19 in February 2020 (RODRIGUEZ-MORALES, *et al.* 2020), and there were 34 confirmed cases at the time it was declared a pandemic (WORLD HEALTH ORGANIZATION, 2020a), with the first associated death on March, 19th, 2020 (WORLD HEALTH ORGANIZATION, 2020b). On March 15th, 2021, there were 11.363.380 cases and 275.105 deaths (WORLD HEALTH ORGANIZATION, 2021). According to data from the Brazilian Ministry of Health, on February 9th, 2022, Brazil reached the mark of 26.955.434 cases and 635.074 deaths (MINISTÉRIO DA SAÚDE, 2019).

SARS-COV-2 is transmitted among human beings by saliva and mucus droplets that come in direct contact with the oral cavity, nose, and eyes. Although most people have light symptoms, being more common at the beginning of the disease, such as a fever, fatigue, dry cough, myalgia, and dyspnea, some infected ones may present headache, dizziness, abdominal pain, diarrhea, nausea, and vomiting. In addition, some people develop pneumonia and need to be hospitalized. Since the mouth is one of the anatomical sites primarily contaminated, oral manifestations have also been reported beyond the serious consequences inherent to progressive respiratory failure for alveolar damage (WANG *et al.*, 2020; ZHU *et al.*, 2020; AMORIM DOS SANTOS, *et al.* 2021).

It has been reported that the coronavirus invades human cells through receptors of the angiotensin-converting enzyme 2 (ACE2). Therefore, cells expressing this receptor may become hosts for the virus, especially the epithelial surface of the stratum corneum in the tongue and gum. The interaction between virus and ACE2 receptor is believed to be responsible for taste disorders in patients infected with COVID-19 due to inflammatory processes in related organs and tissues, such as the tongue, mucosa, and salivary glands, compromising the sensitivity of these structures (WANG, *et al.* 2020; MARIZ, *et al.* 2020; XU, *et al.* 2020; SAKAGUCHI, *et al.* 2020).

Additionally, other oral manifestations in patients infected with COVID-19 have been cited in studies around the world, as vesicle-bullous lesions, painful ulcers, scaly gingivitis, dry mouth, and tongue burning. However, these types of oral conditions are reported less frequently, leaving doubts about whether they are due to the disease itself or whether they are a secondary manifestation of the patient's systemic condition (BIADSEE, et al. 2020; PARADOWSKA-STOLARZ, et al. 2021 ).

In this sense, the main objective of this study is to analyze a group of hospitalized patients infected by SARS-CoV-2 to identify their oral manifestations possibly related to COVID-19, and also observe the symptoms and injuries. We believed that this experience report might encourage dental professionals to focus on detailed intraoral examination before initiating any dental treatment on COVID-19 suspected or confirmed patients.

Furthermore, the secondary objective of this experience report is to demonstrate the importance of hospital dentistry. This field is a new area of dentistry performance and a great ally for preventing oral infections, therapeutic actions for orofacial diseases, and diagnosis of oral manifestations of systemic origin, in order to maintain oral health and improve the quality of life of patients with systemic diseases. It is a challenging field, and like other health areas, the professionals were exposed to a high risk of COVID-19 contagion during the pandemic, facing work overload and high levels of stress (KOCHHAR, et al. 2020; SOUZA, et al. 2021; SILVA, et al. 2023).

## 2. MATERIALS AND METHODS

A prospective study was carried out with patients diagnosed with COVID-19 in the period between March and June 2021, admitted to the Moderate COVID-19 Care Unit of the Hans Dieter Schmidt Regional Hospital, with 15 beds of capacity at that time.

The beginning of the study corresponded to the most critical period of the pandemic in the city, as on February 25th, 2021 there was a new phase of growth in the contagion of the disease, followed by the exhaustion of the health system and higher rates of hospitalizations and deaths, with deceleration on April 19th, 2021, still maintaining a high commitment to hospital services (CÂMARA MUNICIPAL DE JOINVILLE, 2021a; CÂMARA MUNICIPAL DE JOINVILLE, 2021b).

Participants answered a form elaborated based on the COVID-19 Anosmia Reporting Tool from the American Academy of Otorhinolaryngology - Head and Neck Surgery (AMERICAN ACADEMY OF OTOLARYNGOLOGY, 2020) that was applied

and filled out by the researchers. The information collected included age, sex, COVID-19 test status, the probable source of infection, risk factors, associated comorbidities, period and duration of the oral manifestation after its first notice, the presence of other symptoms (fever, chills, malaise, fatigue, cough, headache, nasal congestion, runny nose, gastrointestinal irritation, anosmia, and dysgeusia), and whether there has been any treatment for oral manifestations.

Clinical and laboratory data were collected from the electronic medical records at the hospital service. An intra-oral clinical examination was performed in an orderly manner, evaluating the labial and buccal mucosa, inserted gingival and free gingival, interdental papilla, alveolar ridge, tongue, the floor of the mouth, hard and soft palate, visible portion of the oropharynx, occlusion, and teeth.

Quantitative data were presented as numbers with percentages and mean  $\pm$  standard deviation (*SD*). The statistical analysis of sex and age according to COVID-19 severity was performed using Fisher's exact test. The statistical significance was set at  $p \leq .05$  with a 95% confidence interval.

The research project was evaluated and approved by the Research Ethics Committee of the Hospital Dona Helena, according to guidelines established in Resolution 466/2012 of the National Health Council, under register number 4.638.490.

### 3. RESULTS

There were 45 patients included in the study, counting 24 males (53.3%) and 21 females (46.6%). The age ranged from 19 to 85 years, with a mean of  $56.3 \pm 17.3$  years. At the time of the study, all patients had at least one SARS-CoV-2 positive test confirming the diagnosis and were treated for the acute phase of the disease at the hospital.

Out of all patients, 15 (33.3%) reported both olfactory and taste dysfunction (OTD) among clinical symptoms, being 9 males (60%) and 6 females (40%), who were older ( $57.4 \pm 15.6$  years) compared to patients without OTD ( $55.8 \pm 18.3$  years), but not reaching statistical significance.

The duration of OTD varied from 1 to 10 days, with an average of  $5.9 \pm 3.0$  days. However, in three patients (20%), the OTD persisted following recovery from COVID-19 infection evidenced by a SARS-CoV-2 negative test. Considering the general clinical condition, eight patients (53.3%) presented symptom improvement after the OTD was

first noticed. In contrast, five individuals (33.3%) had general clinical worsening, and two (13.3%) remained with the same medical status.

Regarding other oral manifestations evaluated, two patients reported dry and burning mouths. In addition, one patient reported a change in taste associated with plaque-like changes in the tongue. No patients presented ulcers or other lesions in the oral cavity.

#### 4. DISCUSSION

Although the clinical and epidemiological characteristics of patients with COVID-19 have been studied by several researchers, the number of studies related to the development of anosmia or dysgeusia in hospitalized patients to date is still scarce. Hence, the contribution of Hospital Dentistry may be relevant through specific oral health measures, offering the necessary support for the investigation of signs and symptoms related to systemic diseases such as COVID-19. It includes diagnosis and planning of prevention strategies and treatment management, performing careful oral, intraoral and oropharyngeal examinations, and documenting all suspicious oral lesions in patients with COVID-19, especially when there is a complaint of taste and smell loss (SOUZA, *et al.* 2021; BRANDÃO, *et al.* 2021; SINADINOS, *et al.* 2020, TAN, *et al.* 2022).

From the clinical evaluation performed in our study, it was observed that patients with mild and moderate symptoms did not report taste or smell dysfunctions separately, but simultaneously, representing 33.3% of all patients. This finding corroborates the study of Bénézit *et al.* (2020), who noticed that many patients reported a loss of smell (hyposmia) and taste (hypogeusia) during the initial phase of the COVID-19 outbreak in France, a fact that motivated them to investigate the incidence of these symptoms and their usefulness for the presumptive diagnosis of COVID-19. Using a questionnaire that was applied to 452 patients at reference centers for infectious diseases in Rennes, Angers, and Nantes, they observed that 24% and 20% of patients had taste and smell dysfunctions, respectively. In addition, 17% had both disorders in concomitance. It is noteworthy that, contrary to the present study, these patients were not in a hospital environment.

Lechien *et al.* (2020), while analyzing 1420 hospitalized or bedridden patients with a standardized questionnaire applied by doctors from 18 European hospitals in France, Italy, Belgium, Switzerland, and Spain, also found high prevalence rates of OTD, reaching 70.2% for loss of smell and 54.2% for gustatory dysfunction. The authors also observed greater involvement of women compared to men.

Mao *et al.* (2020) performed a retrospective study with 214 patients in three referral hospitals for treatment of COVID-19 infection in Wuhan, China, aiming to study the neurological manifestations through the analysis of medical and nursing reports, laboratory findings, and imaging exams analyzed by two experienced neurologists. They reported the occurrence, albeit small, of OTD among their revised patients, with only 5.6% showing taste disorders and 5.1 % with olfactory disorders.

In addition, another aspect that can be very important in patients with COVID-19 corresponds to the appearance of lesions in the oral mucosa. Tapia *et al.* (2020), in their report based on four patients infected with COVID-19, observed the presence of vesiculobullous and macular lesions in the oral mucosa. However, the authors could not clarify the significance and pathophysiology of these oral manifestations in the clinical progression or outcome of infection.

Iranmanesh *et al.* (2021) published a review article based on selected 35 scientific articles, including case reports, case series, and letters to the editor. The main COVID-19 oral manifestations observed included ulcer, erosion, blister, vesicle, pustule, fissured or depopulated tongue, macula, papule, plaque, pigmentation, halitosis, whitish areas, hemorrhagic crust, necrosis, petechiae, swelling, erythema, and spontaneous bleeding. It is important to highlight that situations such as lack of oral hygiene, opportunistic infections, stress, immunosuppression, vasculitis, and secondary hyper-inflammatory response to COVID-19 may predispose to the appearance of oral lesions in patients with this disease.

Therefore, despite oral lesions have been reported worldwide in some studies with patients affected by COVID-19, doubts remain on whether these lesions are directly due to infection by Coronavirus or secondary manifestations of the systemic condition of the patient. Also, the oral manifestations related to COVID-19 are non-specific and, until confirmed otherwise, any patient with olfactory or gustatory dysfunction can be considered infected (MEINI, *et al.* 2020; SURBOYO *et al.* 2021).

Severe cases of COVID-19 can present serious respiratory complications, and in these situations, it leads patients to depend on mechanical ventilation for a prolonged time worsening the prognosis. For this reason, it is necessary to adopt preventive measures for such complications. Oral hygiene, in addition to patient comfort, can reduce oral colonization, prevent infections, and maintain the integrity of the mucosa. However, in hospital environments, it is usually performed by the nursing technician, who may be

unaware of the importance of the procedure, or it cannot be a routine task of the institution, which leads to a lack of prioritization of the procedure (SILVA, *et al.* 2020).

## 5. CONCLUSION

Olfactory (anosmia) and taste dysfunction (dysgeusia) are the most common manifestations of COVID-19 disease found in this study, followed by burning mouth and change in taste. However, no patients presented ulcers or other lesions in the oral cavity. An older age, underlying conditions (diabetes mellitus, immunosuppression, etc.), and severity of COVID-19 disease seem to be the most common factors that predict the intensity of oral symptoms in these patients. In addition, we observed that the hospital environment might favor predisposing factors for the development of oral manifestations in COVID-19 through opportunistic infections, trauma secondary to intubation, lack of oral hygiene, and high level of stress.

Oral health is essential for maintaining general health, thus dental care is fundamental for all patients and should be implemented by well trained professionals, aiming to early diagnosis of systemic diseases with oral manifestations, development of oral hygiene protocols, and performance of studies to reduce risks to the patient. Thereby, avoid a worsening of their clinical condition, the use of supplies, and the need for this patient to occupy a bed in the Intensive Care Unit.

Nonetheless, most Brazilian hospitals still do not have a dental surgeon on their teams, mostly because of the lack of prioritization of dental care. In fact, one of the most significant challenges found in this study was access to patients. For this reason, we believe that studies that demonstrate the importance of oral health in hospital environment, such as this one, are essential for the appreciation and expansion of hospital dentistry.



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