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Manifestations COVID-19 in the Oral Cavity: A Systematic Review

Adelina Torgomyan[1], Marina Saroyan[2], Sergo Hovhannisyan[3], Mashinyan Karen[4], Lazar Yessayan[5] and Gagik Hakobyan[6]*

[1]Associate professor, Department of Physiology, Yerevan State Medical University after M. Heratsi, Armenia.

[2]Senior lecturer, Department of Physiology, Yerevan State Medical University after M. Heratsi, Armenia.

[3]Associat professor, Department of Prosthodontics, Yerevan State Medical University after M. Heratsi, Armenia.

[4]Associat professor, Department of Prosthodontics, Yerevan State Medical University after M. Heratsi, Armenia.

[5]Professor, Head of Dept.of Therapeutic Dentistry, Yerevan State Medical University after M. Heratsi, Armenia.

[6]Professor, Head of Dept. of Oral and Maxillofacial Surgery Yerevan State Medical University after M. Heratsi, Armenia.

***Correspondence:**
Gagik Hakobyan Mailing addres: 0028 Kievyan str. 10 ap. 65 Yerevan, Armenia, Tel: (+37410)271146.

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ABSTRACT

With COVID-19, along with other organ systems, symptoms can also appear in the oral cavity. COVID-19 can cause a number of pathological conditions in the oral cavity of patients, candidiasis, xerostomia, recurrent herpetic lesions, ulcers, vesicles, desquamative gingivitis have been reported, the tongue, palate, lips, gums and buccal mucosa may be affected, Patients with COVID-19 may have difficulty swallowing, burning sensation, most patients have impaired taste and smell.

However it is still impossible to draw a clear parallel between the manifestations of dental diseases and the severity of the coronavirus infection, since too little statistical data and clinical observations are available therefore needed for further investigation. The goal of this revue was to compile a list of COVID-19 symptoms in oral tissues and analyze the potential etiopathogenesis that may influence the development of these oral lesions. The key terms were used to search international databases for information. A total of 50 sources on relevant topics were chosen. These preliminary data explain the underlying mechanism oral lesions in COVID-19, and will help on future preventive strategies in clinical practice and in everyday life.

Keywords
Coronavirus, Oral cavity, Lesions, Mucosa.

Introduction

SARS-CoV-2, discovered in 2019, caused the coronavirus illness (COVID-19), and was the cause of the current COVID-19 epidemic that has affected a large part of the world's population [1,2]. Diagnosis of COVID-19 done using PCR, the material is taken from the pharynx, secretions from the lower respiratory tract [3]. With COVID-19, the most common symptoms are raising temperature, runny nose, cough, fatigue, complicated shortness of breath, taste and smell disturbance, and pneumonia [4].

The oral cavity is one of the main entry routes for SARS-CoV-2, inflammatory enzymes and chemicals accumulate in the gingival sulcus and promote microbial colonization, resulting in mucosal changes [5]. With the above, the purpose of this article is to review pathogenesis and oral manifestations COVID-19.

Materials and Methods

For the review, 50 sources were selected using the PubMed and Scopus databases. The key terms: SARS-CoV-2 infection, oral manifestations of COVID-19, lesions of the oral mucosa in patients with COVID-19, pathogenesis of COVID-19 in the oral cavity, SARS-CoV-2 in saliva, taste impairment at COVID-19, were used to search for information in international databases.

Due to the presence of ACE2 receptors, the oral mucosa is highly susceptible to SARS-CoV-2 infection. After contact is established to initiate viral entry into the cell, transmembrane serine protease 2 is one of the enzymes required to cleave the binding protein S. The virus, penetrating inside the cell, using the mechanism of the host cell, releases the genetic material and begins to duplicate it [6]. One of the main effects of SARS-CoV-2 infection is formation of an immunological response.

The penetration of macrophages and neutrophils into the affected tissue is accompanied by a strong production of cytokines and a weak interferon response, resulting in a cytokine storm [7,8]. SARS-CoV-2 is thought to have many entry points into human cells [9]. The receptor–protease-mediated mode of entry, on the other hand, is significant because it boosts viral infectivity [10].

Transmembrane protease serine Serine 2 (TMPRSS2) is a key protease in SARS-CoV-2 infection and is a prospective COVID-19 camostat mesylate [11-19]. The spike protein (SP) is involved in binding to the cell membrane, a process that is triggered by certain enzymes such as furin and these proteases is a critical factor in viral infection [20,21]. Immunohistochemical and molecular biological studies in the oral cavity showed higher levels of ACE2 expression in the surface and epithelium and stratum corneum of the tongue than in the gingiva [22,23]. However, ACE2 expression varied between individuals, female hormones [24], salt [25] and smoking [26], among others, alter ACE2 expression. The infectious potential of the tongue may be limited by the surface cells that secrete it [27]. SARS-CoV infected cells remain in the oral cavity and aspiration of these cells may be associated with LRT23 infection [28]. Saliva, on the other hand, contains a large number of protease inhibitors, according to the database analysis. Infected individuals may experience moderate symptoms such as fever, tiredness, myalgia, and a dry cough [29].

In the early stages of COVID-19, symptoms such as altered taste perception, dysgeusia, and burning sensation in the mouth have been found [30], as the disease progressed, patients also developed ulcerative lesions or Candida albicans are mostly on the tongue, palate, lip, and cheek [31-33].

One of the symptoms of COVID-19 is altered taste perception, dysgeusia and a burning sensation in the mouth [30], some patients also developed ulcerative lesions, a fungal infection mainly on the tongue, palate, lips and cheeks [31-33].

Dysgeusia (various taste disorders) is one of the symptoms often found in patients with COVID-19. According to this 45 percent overall taste disorder prevalence, 38 percent dysgeusia, 35 percent hypogeusia, and 24 percent ageusia. In the genesis of loss of taste lies neurotropism, an important role is played by the crossing of the olfactory epithelium directly through the lamina cribrosa and reaching the central nervous system [24,25]. Furthermore, when compared to patients who did not have COVID-19 but had similar symptoms, there was a strong link between taste problems and COVID-19 positivity.

Oral mucosal lesions, unlike taste problems, were recorded in only a few case reports, leading to debate over whether this type of illness is caused directly by SARS-CoV-2 or is a later manifestation. Nonetheless, the manifestations included ulcers, blisters, macules, and plaques that varied in amount, color look, and location.

Ulcers were the most common lesions develop as a result of the immunosuppression inherent in COVID-19 disease. According to Kitakawa's observations, ulcerative lesions were most common in moderate to severe COVID-19, and the occurrence of ulcers was linked to herpes [36].

In the immunosuppression inherent in COVID-19, C albicans is part of the oral microbiome of a healthy person; may affect mucous membranes. This damage, according to Villarroel-Dorrego et al., is a side effect of COVID-19 and not a direct result of SARS-CoV-23 [37]. Geographic tongue has also been observed in patients with COVID-19, despite the fact that these conditions are very common in the general population [37]. According to Jimenez-Cauhe histological studies, oral lesions may be the result of thrombotic mucosal vessel injury and subsequent vasculitis [38].

COVID-19 patients have also been reported to exhibit enanthem-like lesions Petechiae, erythematous macules, and erythematous–vesicular patterns in the oral mucosa are among these, which are frequently linked with subsequent viral clinical symptoms. In the buccal mucosa of patients, viral infection manifested itself in a variety of ways [39,40].

It is unusual to see a divergent pattern of mucosal lesions caused by a single pathogen [41]. Cox et al. emphasized the importance of co-infection research in severe respiratory diseases [42]. Antibiotics are often given to admitted patients, but little information on bacterial sensitivity is provided [42]. In addition, the majority of patients experienced oral mucosal injury throughout their hospitalization, implying that coinfections, immune compromise, or adverse drug reactions to COVID-19 treatment were to blame. Many fatal COVID-19 cases were found to have bacterial and fungal coinfections, according to studies [43].

These data suggested that the mouth cavity should be considered a high-risk area for COVID-19 infection [44-50]. However, it is still impossible to draw a clear parallel between the manifestations of dental diseases and the severity of the coronavirus infection, since too little statistical data and clinical observations are available. These preliminary data explain the underlying mechanism oral lesions in COVID-19, and will help on future preventive strategies in clinical practice and in everyday life.

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