BULLETIN OF STOMATOLOGY AND MAXILLOFACIAL SURGERY
Volume 21, Issue 10

DOI:10.58240/1829006X-2025.21.10-373

CASE REPORTS

ORAL MANIFESTATIONS OF COVID-19: A CASE SERIES

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Received: *Oct.12. 2025;* ***Accepted:*** *Nov 12. 2025;* ***Published:*** *Nov 16. 2025*

ABSTRACT

Background: Oral symptoms may serve as the initial indications of COVID-19 prior to the onset of systemic symptoms. An understanding of these indicators facilitates rapid diagnosis and early detection.
Objective: This case study presents early oral symptoms observed in 15 patients subsequently diagnosed with COVID-19.
Materials and Method: The cases were organised based on the form of oral lesions. The clinical features, duration of symptoms, treatment regimens, and outcomes were documented.
Results: The most frequently observed oral lesions included ulcerative lesions (n=6), stomatitis (n=4), dysgeusia/ageusia (n=2), angular cheilitis (n=2), and oral candidiasis (n=1). Lesions, frequently painful, initially manifested two to six days prior to the onset of systemic COVID-19 symptoms. The treatment involved supportive care, topical corticosteroids, antiseptics, antifungals, and symptomatic therapy. Dysgeusia persisted for up to three weeks, whereas most lesions resolved within ten to fourteen days. No long-term complications or recurrences were observed.
Conclusion: Initial oral manifestations may be valuable clinical indicators for diagnosing COVID-19. Practitioners should be knowledgeable about these presentations to facilitate early identification and treatment.

***Keywords*:** COVID-19, oral manifestations, ulcerative lesions, dysgeusia, stomatitis

INTRODUCTION

The SARS-CoV-2 virus is responsible for the COVID-19 pandemic. It has a complicated clinical picture going way beyond respiratory problems.[1] Fever, coughing, sore throat, myalgia, arthralgia, headache, dyspnoea, and excessive sputum production are the most frequently reported symptoms, which are typical of viral infections.[2] However, more unusual clinical presentations-such as gastrointestinal issues including anorexia, tremors, nausea, vomiting, and diarrhoea, dermatological symptoms, and chemosensory impairments-have been documented.[3,4]

Besides, emerging evidence suggests that the oral cavity could be another place for the virus to act and a mirror of the systemic inflammatory process.[5] Hence, a variety of oral lesions emerged in patients with COVID-19, but their pathogenesis and clinical significance were poorly understood. These oral manifestations, which could appear before, at the same time as or after some systemic symptoms, could indicate infection and the severity of illness.[6] Reported lesions differ from ulcerative to vesiculobullous eruptions, dysgeusia and anosmia, candidiasis, and vascular alterations such as petechiae.[7]

The multifactorial nature of the mechanisms involved in these oral manifestations encompasses direct viral tropism, immune dysregulation, and vascular changes.[8] In addition, a pre-existing oral condition and oral hygiene may contribute to the perception and appearance of various severities of these lesions. Understanding and recognising these oral manifestations is important for early detection and treatment and better patient outcomes considering COVID-19.[9]

Literature Review

The coronavirus disease 2019 (COVID-19), first induced by the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), has garnered increased attention about non-respiratory symptoms, particularly oral manifestations.[10] Angiotensin-converting enzyme 2 (ACE2) receptors are prevalent in the oral cavity and serve as entry routes for SARS-CoV-2, making them a possible target for early viral infection.[11] As they have been noted to precede respiratory symptoms, research on oral lesions, dysgeusia, and mucosal changes suggests these may act as early indications of infection.[12]

Numerous studies have documented various oral symptoms associated with COVID-19. Taste abnormalities like as dysgeusia, hypogeusia, and ageusia have been thoroughly reported; certain investigations suggest the virus directly affects the gustatory pathways in a neurotropic fashion.[13] Amorim dos Santos et al. conducted a systematic review in 2021, revealing that dysgeusia was one of the most often reported oral symptoms in COVID-19 patients, occurring even without respiratory symptoms.[7]

Mouth ulcers and mucosal lesions have also been frequently referenced.[14] Anarthe et al. (2023) identified aphthous-like ulcers, erythematous patches, and vesiculobullous lesions, which are most likely the result of direct viral impacts, immunological dysregulation, or secondary infections. Patients who have contracted COVID-19 have experienced candida-associated lesions, such as pseudomembranous candidatures and angular cheilitis, which are likely the result of reduced immunity, stress, or prolonged corticosteroid and antibiotic treatment.[6]

Reports of COVID-19 patients exhibiting inflammatory alterations in the tongue include glossitis and papillae loss.[15] In a 2022 study, Sharma and Bhardwaj proposed the term "COVID tongue" to describe inflammation, oedema, and tongue depapillation, which may be associated with changes in the oral microbiome and immune response that are induced by viruses.[15]

The precise pathophysiological mechanisms that generate oral COVID-19 symptoms are currently unknown, despite the completion of numerous investigations.[10] The potential outcomes include viral-induced endothelial injury, immune-mediated tissue degradation, and infections resulting from immunological suppression.[16] Additional research is necessary to investigate the effects of cytokine storms on oral tissues and the roles of ACE2 receptors in the oral epithelium.[17]

Early oral manifestations of COVID-19 must be identified, particularly in asymptomatic or mildly symptomatic individuals, to facilitate prompt identification and isolation.[6] Clinicians must be vigilant in identifying and documenting oral lesions associated with SARS-CoV-2 infection to enhance early detection and patient management.[18]

CASE PRESENTATION

This case series includes 15 patients who developed early oral manifestations before being diagnosed with COVID-19. According to the initial diagnosis, there were six ulcerative lesions, four stomatitis lesions, two cases of dysgeusia, one case of candidiasis, and two cases of angular cheilitis. The distribution of different lesions based on the initial diagnosis is illustrated in Figure 1. There were 9 male patients and 6 female patients. The cases are grouped based on the type of oral presentation for clarity.

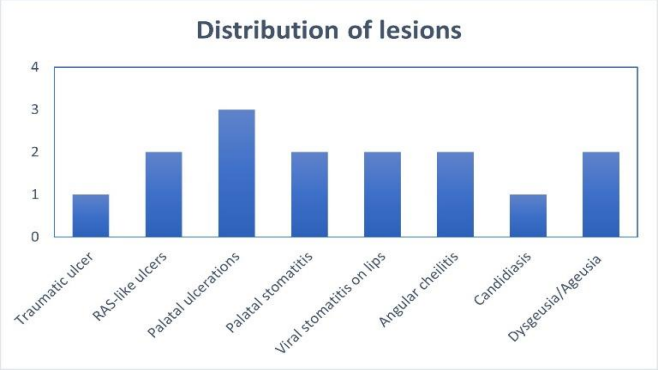

Figure 1. Showing the distribution of different lesions based on the initial diagnosis.

Ulcerative Lesions (Cases 1–6)

Six patients (ages 32–58 years) presented with various ulcerative lesions in different oral sites. One patient had an ulcer on the right ventrolateral tongue (initially diagnosed as traumatic ulcer), another had multiple recurrent aphthous stomatitis (RAS)-like ulcers on the right upper labial mucosa, and a third had a large linear recurrent aphthous stomatitis (RAS)-like ulcer on the left soft palate. All patients reported severe pain associated with the ulcers.The various ulcers are depicted in Figure2.

Figure 2. Showing the various ulcers. 2A: Case 1 - Traumatic ulcer (Rt ventrolateral tongue); 2B: Case 2 - Multiple RAS-like ulcers (Rt upper labial mucosa); 2C: Case 3 - Large RAS-like ulcer (Lt soft palate).

Additionally, three patients exhibited palatal ulcerations, with one showing a pseudo-membrane covering suggestive of a viral aetiology. The various palatal ulcers are depicted in Figure 3.

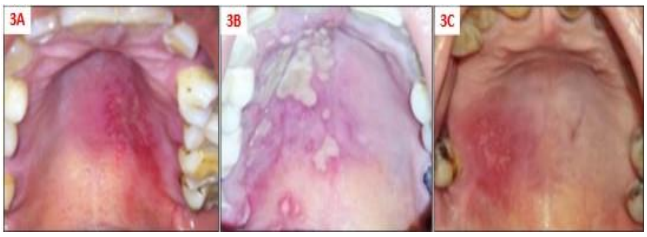

Figure 3. Showing the multiple palatal ulcerations. 3A: Case 4 - Palatal ulcerations (Left palate); 3B: Case 5 - Multiple ulcers (Rt palate) with pseudo membrane; 3C: Case 6 - Palatal ulcerations (Rt palate).

The initial duration of symptoms ranged from 2 to 5 days before systemic symptoms of COVID-19 appeared. These ulcers were initially managed with topical corticosteroids, antiseptic mouthwash, and analgesics. Upon confirmation of COVID-19 via RT-PCR and antigen tests, patients were given supportive care, hydration, and vitamin supplementation. Healing occurred within 10–14 days, with complete resolution at follow-up.

Stomatitis (Cases 7-10)

Four patients (ages 25–60 years) presented with stomatitis affecting the palate, lips, or maxillary denture-bearing area. Two patients exhibited viral stomatitis on the lips, while another had denture stomatitis on the maxilla. These lesions are depicted in Figure 4.

Figure 4. Showing the different stomatitis cases. 4A: Case 7 - Viral stomatitis (Upper & lower lip); 4B: Case 8 - Viral stomatitis (Lower lip); 4C: Case 9 - Denture stomatitis (Maxilla).

One case of palatal stomatitis was initially misdiagnosed as allergic stomatitis before COVID-19 was confirmed. Palatal stomatitis is depicted in Figure 5.

Figure 5. Case 10 - Showing the palatal stomatitis, which was initially misdiagnosed as allergic stomatitis.

Symptoms lasted 3–6 days before systemic COVID-19 signs emerged. Where necessary, patients were treated with topical corticosteroids, antiseptic mouthwash, and antifungal agents. Following COVID-19 confirmation, management focused on symptomatic relief and oral hygiene measures. Resolution occurred within 12–16 days, with no complications at follow-up.

Angular Cheilitis (Cases 11, 12)

Two patients (ages 24 and 45 years) developed angular cheilitis, characterised by cracks and sores at the corners of the mouth. Symptoms preceded systemic COVID-19 onset by 2–4 days. These lesions are depicted in Figure 6.

Figure 6. Showing the two angular cheilitis cases (case 11 & 12).

Initially, these lesions were treated with topical antifungal agents and emollients. After COVID-19 confirmation, antifungal treatment was continued with nutritional support (iron, B vitamins). Complete healing occurred within 7–10 days, with no recurrence.

Candidiasis (Case 13)

One patient (age 33 years) presented with scrapable white patches on the dorsal tongue, diagnosed as oral pseudomembranous candidiasis.This pseudomembranous candidiasis is depicted in Figure 7.

Figure 7. Oral pseudomembranous candidiasis on the dorsal tongue (Case 13).

Symptoms persisted for 3 days before systemic signs of COVID-19 developed. Initial treatment included topical antifungal agents, which were continued post-COVID-19 diagnosis, along with immune support and hydration. Complete resolution was observed in 8–12 days.

Dysgeusia/Ageusia (Cases 14, 15)

Two patients (ages 28 and 36 years) reported sudden-onset taste disturbances (dysgeusia/ageusia), described as a metallic or bitter taste. These symptoms lasted 1–2 days before systemic manifestations of COVID-19 appeared. No specific treatment was provided before diagnosis. Post-confirmation, patients received supportive care and multivitamins, with symptoms gradually resolved within 2–3 weeks.

Follow-Up

All patients were followed up for at least four weeks after their initial presentation. The oral manifestations gradually resolved within 10–14 days in most cases, with complete resolution coinciding with the improvement of systemic COVID-19 symptoms. No long-term oral complications were observed. Patients

with ulcerative lesions showed significant healing within 10–14 days, while those with fungal infections responded well to continued antifungal therapy. Taste disturbances persisted for up to three weeks in some cases but eventually improved without specific intervention. None of the patients reported a recurrence of oral symptoms post-recovery.

The demographic details and treatment summaries for all cases are presented in Table 1.

Table 1. Showing the distribution of different lesions based on the initial diagnosis

Case	Age	Gender	Initial Diagnosis	Initial Symptoms Duration	Treatment Before COVID-19 Diagnosis	Treatment After COVID-19 Diagnosis	Duration of Oral Lesions
1	32	Male	Traumatic ulcer (Rt ventrolateral tongue)	2 days	Topical corticosteroids, antiseptic mouthwash	Supportive care, hydration, vitamin C	10 days
2	26	Female	Multiple RAS-like ulcers (Rt upper labial mucosa)	3 days	Topical corticosteroids, analgesics	Supportive care, hydration	12 days
3	38	Male	Large RAS-like ulcer (Lt soft palate)	4 days	Topical corticosteroids, antiseptic rinse	Vitamin supplementation, supportive care	14 days
4	42	Male	Palatal ulcerations (Left palate)	3 days	Analgesics, antiseptic rinse	Supportive care, vitamin supplementation	12 days
5	55	Female	Multiple ulcers (Rt palate) with pseudo membrane	4 days	Antiseptic mouthwash, antiviral therapy	Supportive care, hydration	14 days
6	58	Female	Palatal ulcerations (Rt palate)	3 days	Analgesics, antiseptic rinse	Supportive care, vitamin supplementation	10 days
7	29	Male	Viral stomatitis (Upper & lower lip)	3 days	Antiseptic mouthwash, antiviral cream	Supportive care, hydration	14 days
8	31	Male	Viral stomatitis (Lower lip)	5 days	Topical analgesics, antiseptic rinse	Supportive care, immune support	12 days
9	60	Female	Denture stomatitis (Maxilla)	6 days	Antifungal agents, denture hygiene advice	Antifungal continuation, symptomatic relief	16 days
10	50	Female	Allergic Stomatitis (Palate)	3 days	Antihistamines, Antiseptic mouthwash	Symptomatic relief, hydration	8 days
11	45	Male	Angular cheilitis	3 days	Topical antifungal agents	Continued antifungal therapy, nutritional support	12 days
12	24	Male	Angular cheilitis	4 days	Topical antifungal, emollients	Iron, B vitamins, antifungal continuation	10 days
13	33	Male	Candidiasis (Dorsal tongue)	3 days	Topical antifungal agents	Continued antifungal, immune support	10 days
14	28	Female	Dysgeusia	1 day	None	Supportive care, multivitamins	18 days
15	36	Male	Ageusia	2 days	None	Supportive care, multivitamins	21 days

This case series highlights the diverse early oral manifestations of COVID-19 and underscores the need for oral healthcare professionals to recognise these presentations for early suspicion and testing.

DISCUSSION

Multiple studies have documented oral mucosal lesions in COVID-19 patients, associating these manifestations with immune dysregulation, direct viral cytopathic effects, drug-induced reactions, and secondary opportunistic infections.[19] Santos et al., conducted a study that identified petechiae, ulcerative lesions, and candidiasis in COVID-19 patients. This study underscores the possibility that oral lesions may result from both inflammatory responses and viral tropism.[7] The results of this case series were further supported by a different study that also documented vesiculobullous lesions, erythema, and necrotic ulcers in COVID-19 patients.[20]

The distinct oral symptoms detected in this study are consistent with earlier studies, ranging from stomatitis and ulcerative lesions to candidiasis and angular cheilitis. Ulcerative lesions, especially those resembling recurrent aphthous stomatitis (RAS), have been frequently documented in COVID-19 patients.[21] Research conducted by Iranmanesh et al. appears to endorse plausible explanations, such as hypercoagulability, direct viral invasion, and systemic inflammation. In contrast to them, which suggested ulcers lasted for up to 3 weeks, our study demonstrated complete resolution within 2 weeks, indicating variability in therapeutic effectiveness and patient response.[20]

Furthermore, our investigation revealed stomatitis in the denture-bearing area, palate, and mucosa of the lips. Brandini et al. identified a correlation between viral replication in oral mucosal cells and comparable presentations.[19] A case of palatal stomatitis misidentified as allergic stomatitis highlights the difficulties in recognising oral manifestations related to COVID-19 and underscores the necessity for heightened clinical awareness among dental professionals.

Our study also identified opportunistic fungal infections, such as angular cheilitis and candidiasis, following the findings of Nuno-Gonzalez et al., and Carreras-Presas et al., who identified corticosteroid use and immunological suppression as contributing factors.[22,23] In addition, two of the fifteen participants in our study exhibited ageusia and dysgeusia, two taste disorders typically seen in COVID-19 patients. Vaira et al. found that over half of COVID-19 patients had taste dysfunction, which may be due to viral damage to the olfactory pathway and taste receptors.[24]

Several fundamental pathogenetic processes are associated with oral manifestations of COVID-19. Lin et al.'s research provides a comprehensive analysis of the mechanisms responsible for the oral manifestations of COVID-19 patients. They claim that the transmembrane serine protease 2 (TMPRSS2) and angiotensin-converting enzyme 2 (ACE2), which are highly expressed in the tongue, salivary glands, and oral mucosa, allow the SARS-CoV-2 virus to enter oral tissues. This supports the findings of our case series showing oral lesions before systemic symptoms and shows the viral preference for oral tissues.[10]

The ulcerative lesions identified in this study align with prior findings suggesting that inflammation and direct viral invasion lead to mucosal deterioration.[25,26] Furthermore, impaired wound healing and ischaemic ulcers may be characteristics of severe COVID-19, systemic inflammation, and a hypercoagulable condition.[27] The aphthous-like ulcers in our cohort agree with the results of Santos et al., who associated these lesions with epithelial damage caused by cytokines.[7]

One of the most frequently reported symptoms among COVID-19 patients is dysgeusia, which has been attributed to a variety of mechanisms. Research has demonstrated that SARS-CoV-2 can induce ageusia and dysgeusia by disrupting neural signalling in the olfactory epithelium by infecting sustentacular cells.[28] The transient nature of the taste indicates a reversible functional impairment rather than irreversible damage. This aligns with the dysgeusia cases documented by Vaira et al., where patients reported taste disturbances lasting up to three weeks.[24]

The reported fungal infections, including oral candidiasis, in COVID-19 patients may be explained by immune dysregulation, long-term corticosteroid treatment, and altered oral microbial flora.[29.30] Moreover, diminished salivary flow resulting from SARS-CoV-2 infection of salivary glands exacerbates vulnerability to fungal proliferation. This helps to explain the candidiasis case in our cohort, where the patient responded favourably to immunological support and antifungal treatment.

The association between COVID-19 and opportunistic diseases is further supported by the presence of angular cheilitis in our cohort. According to Lin et al., immunological suppression, nutritional deficiencies, and ensuing fungal infections may cause these lesions.[10] Moreover, the complete resolution of these findings following the administration of antifungal medications and the correction of the underlying nutritional deficiencies further reinforces this concept.

This study's small sample size and absence of histopathological analysis limit its ability to offer a more comprehensive understanding of the pathophysiology of oral lesions associated with COVID-19. Comprehensive cohort studies employing uniform diagnostic criteria will enhance the validation of these findings and deepen the understanding of the mechanisms underlying oral lesions induced by COVID-19. Furthermore, examining the variation in the oral manifestations associated with various SARS-CoV-2 variants would be beneficial. The potential long-term repercussions of this condition on oral

health are also worth investigating.

CONCLUSION

This case series emphasises the potential role of the diverse oral symptoms of COVID-19 in the early diagnosis of the disease. The findings that have been presented provide evidence that COVID-19 is frequently linked to candidiasis, stomatitis, taste disorders, and ulcerative lesions. This study correlates observed manifestations with potential underlying pathogenesis and emphasises several mechanisms, including immunological dysregulation, direct viral invasion through ACE2 receptors, secondary infections, and inflammatory damage. The study emphasises the necessity for dental professionals to enhance their vigilance in the early recognition of oral lesions associated with this condition, thereby facilitating prompt diagnosis and treatment. To improve patient outcomes, more research is required to clarify the long-term effects of COVID-19 on oral health and to improve management techniques.

DECLARATIONS

Funding

This research did not receive any specific grant or financial support from funding agencies.

Competing Interests

The authors have no competing interests to declare.

Informed Consent

Not applicable.

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