

Study of Awareness and Knowledge of Dental Professionals towards Intraoral Findings among Covid-19 Patients in VSPM Dental College and Research Centre, Nagpur

¹Dr. Vaishnavi Dorlikar, Intern, VSPM Dental College and Research Centre, Nagpur, Maharashtra

²Dr. Esha Fulzele, Intern, VSPM Dental College and Research Centre, Nagpur, Maharashtra

³Dr. Fouzia Hasham, Intern, VSPM Dental College and Research Centre, Nagpur, Maharashtra

⁴Dr. Harshita Patil, Intern, VSPM Dental College and Research Centre, Nagpur, Maharashtra

⁵Dr. Sudhir Rawlani, Senior Lecturer, Department of Public Health Dentistry, VSPM DCRC, Nagpur, Maharashtra

⁶Dr. Aniket Dhote, Senior Lecturer, Department of Public Health Dentistry, VSPM DCRC, Nagpur, Maharashtra

Corresponding Author: Dr. Vaishnavi Dorlikar, Intern, VSPM Dental College and Research Centre, Nagpur, Maharashtra

Citation of this Article: Dr. Vaishnavi Dorlikar, Dr. Esha Fulzele, Dr. Fouzia Hasham, Dr. Harshita Patil, Dr. Sudhir Rawlani, Dr. Aniket Dhote, “Study of Awareness and Knowledge of Dental Professionals towards Intraoral Findings among Covid-19 Patients in VSPM Dental College and Research Centre, Nagpur”, IJDSIR- March - 2022, Vol. – 5, Issue - 2, P. No. 21 – 29.

Copyright: © 2022, Dr. Vaishnavi Dorlikar, et al. This is an open access journal and article distributed under the terms of the creative commons attribution noncommercial License. Which allows others to remix, tweak, and build upon the work non-commercially, as long as appropriate credit is given and the new creations are licensed under the identical terms.

Type of Publication: Original Research Article

Conflicts of Interest: Nil

Abstract

Background: Coronavirus disease 19 (COVID-19) manifests in a variety of different ways, including respiratory, thrombotic, neurologic, digestive, and cutaneous manifestations.^[1] Cutaneous signs are categorized into five clinical patterns: acro-ischemic (pseudo-chilblain), vesicular, urticarial, maculopapular, and livedoid.^[1] Oral manifestations have also been recorded, but relatively less frequently.^[1] The cutaneous symptoms of COVID-19 infection are not characterized in brief.^[2] To summarize the cutaneous signs of COVID-19 infection and to correlate them to other clinical findings.^[2] The lesions are categorized as acral sites of erythema with vesicles or pustules (pseudo-chilblain

(19%), different vesicular eruptions (9%), urticarial lesions (19%), maculo-papular eruptions (47%), & livedo or necrosis (6%). Vesicular eruptions occur early in the disease's progression (15% before other symptoms). The pseudo-chilblain pattern appears late in the progression of COVID-19 disease (59 percent after other symptoms), whereas the rest emerge with other COVID-19 symptoms. COVID-19 severity ranges from a less serious infection in acral lesions to more severe disease in the latter categories. In terms of clinical and epidemiological analyses, the outcomes for verified and suspected cases are comparable. Alternative diagnoses are explored, although, for the most detailed patterns, they appear dubious (pseudo-chilblain and vesicular).^[2]

Aim: The survey aimed to study the oral manifestations associated with COVID-19 infection and report the prevalence of oral signs and symptoms in COVID-19 patients.

Result: A total of 200 dental professionals, ages 23–56 years were included in this pilot study, in this we include Interns PG's and staff. From the analysis of the responses, we concluded that the dental professionals are aware of the intraoral findings among COVID 19 patients. It is interpreted that the staff had maximum knowledge regarding Covid-19, followed by postgraduates whereas interns were not clear with their concepts regarding the spread and oral manifestations of Covid-19. The study has assessed the knowledge and awareness of the dentists of Central India on a small scale.

Keywords: Coronavirus Disease 2019, COVID-19, Oral Health, Oral Lesions, SARS-Cov-2, Skin Manifestations; Diagnosis

Introduction

The corona virus disease is a large family of viruses that can cause serious illnesses such as respiratory syncytial virus infection and severe acute respiratory syndrome (SARS).^[3]

The World Health Organization (WHO) has also classified COVID-19 as pandemic disease, which means it is considered a global health emergency.^[4]

Most of the countries that reported a significant number of cases during 2019 have been classified as having December 2019 SAR-CoV-2 infection.^[4]

SAR-CoV-2

infection trigger inflammatory reactions in salivary glands and tongue.^[5]

It can also destroy the keratinocytes and fibroblasts in the oral cavity which will cause loss of taste and oral ulceration.^[5] High viral load in nasal and saliva

can also cause changes in the oral tissue observed in COVID-19 infection.^[6] The oral cavity is a mirror that reflects the underlying health condition. It can be used to evaluate systemic disorders such as Diabetes Mellitus and Cardiovascular disease.^[6] Having an examination of the mouth can help identify early signs of systemic disorders.

Some oral lesions that have been seen after the patient contracts COVID-19 are white and erythematous plaques, irregular ulcers, small blisters, petechiae, and desquamative gingivitis.^[6] Tongue, palate, lips, gingiva, and buccal mucosa were affected. In mild cases, the development of oral mucosal lesions was preceded or at the same time as respiratory symptoms. However, in severe cases, the lesions usually developed 7 to 24 days after the onset of symptoms.^[6]

With an ongoing pandemic of COVID-19, the SARS-CoV-2 virus has impacted the world and posed difficulties to every area of today's healthcare systems. The oral mucosa and saliva are high-risk regions of increased pathogen loads, and dental healthcare practitioners are some of the most exposed. Oral lesions caused by COVID-19, including loss of taste and smell, are typical clinical symptoms in the dental health care context. The SARS-CoV-2 virus has been reported to produce a broad variety of non-specific oral mucosal lesions, however, identifying these mucocutaneous lesions as COVID-19 lesions will assist in SARS-CoV-2 prevention in dental patient care and appropriate treatment for patients.^{[5][6]}

Coronavirus attacks human cells by angiotensin-converting enzyme 2 (ACE2) receptors since the current evidence indicated that ACE2 acts as the primary host cell receptor for severe acute respiratory syndrome coronavirus 2.^[7] As such, the virus will bind to ACE2 using the spike-like protein on its surface, and ACE2

will serve as a cellular portal for viral entry into the cell to cause COVID-19 infection. [8] Hence, organs with high ACE2 expression (e.g., lung) can become target cells during SARS-CoV-2 infection that cause inflammatory reactions in related organs and tissues, such as salivary glands and tongue, which could explain the occurrence of both loss of taste and oral ulceration due to destruction of keratinocytes and oral fibroblasts. [9] Otherwise, high viral load in the saliva and nasal secretion can be a pathogenic factor involved in developing the oral changes associated with COVID-19 infection, which indicates the direct effect of the virus on the oral tissues. [10]

At present, two modes of transmission for SARS-CoV-2 have been identified: direct and indirect transmission. The direct transmission includes contact with the infected individual's body fluids, respiratory or salivary droplets and, other body fluids such as faeces, urine, semen, and tears. [11]

Figure 1: Clinical findings on the oral mucosa.

A) Erythematous bulla of 6 mm of soft consistency non-bleeding bulla on the hard palate. [19]

B) Non-bleeding vascular-like purple macule of 12 mm size (right palatal mucosa) and papule-plaque of 8 mm (left palatal mucosa with soft consistency. [19]

C) Purple bulla with 8 mm diameter with soft consistency on the right side of the tongue. [19]

D) Multiple reddish macules from 3 to 4 mm diameter with indurated consistency on the hard palate [19]

Fig 1:

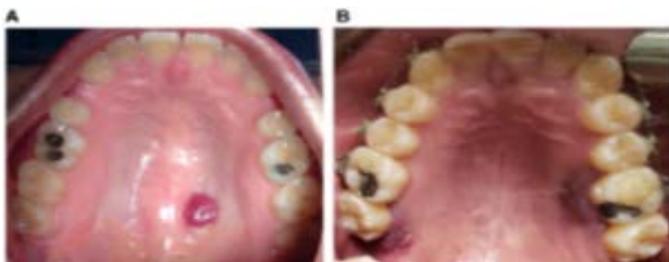


Table 1: Orofacial manifestations of COVID-19

Clinical features	References
Headache	(12–15)
Myofascial pain	(13–15)
Oral ulcerations	(14–16)
Burning sensation of the oral mucosa	(14, 16) (16, 17)
Oral vesicle formation	(14–16, 18)
Loss of taste	(14–16, 18)
Loss of smell	(14, 15)
Dry mouth	(16)
Skin discomfort	

Corona virus has affected the human population globally, and the literature shows the significance of oral lesions in association with the disease, this survey has aimed to assess the awareness and knowledge about intraoral findings in COVID-19 patients among dental professionals.

Aim and objective

The study was aimed to analyze the awareness and knowledge of dental professionals toward intraoral findings among covid-19 patients in VSPM Dental College and Research Centre, Nagpur

Materials and Methodology

The study was approved by the institutional ethics committee (IEC) of the college. The study was conducted among dental professionals residing in central India. A Prospective Cross-sectional study was performed by a self-administered questionnaire (Google form) based survey method to study the awareness and

knowledge among dental professionals towards the intraoral findings among COVID-19 patients over 5 months from August 2021 to December 2021.

A total of 200 participants including dental professionals, interns, postgraduates, and staff who were willing to participate in the study filled out the questionnaire. The inclusion criteria for the study consisted of the practicing dental professionals, interns, postgraduates, and staff who were willing to participate in the study and the undergraduates. Those who were not willing to participate were excluded.

An online validated questionnaire was prepared for an online survey on administration software, Google forms, Table 2

and was distributed via WhatsApp, Face book and Instagram and circulated through an e-link. The study comprised of questions including demographic details such as participant’s age and educational qualification and the 12 close-ended knowledge and awareness-based questions.

The collected data from the questionnaire were analyzed and the information was also recorded in the excel sheet.

Statistical analysis

Data was accumulated in Microsoft excel software after which ANOVA and students paired t-test was performed using SPSS-22 software.

Questions	Parameter	YES	NO	P-value
Awareness about COVID symptoms include oral ulcers	Interns - 97	92	5	0.166
	Postgraduates-52	52	0	
	staff-51	51	0	
Vesicles and bullae	Interns - 97	82	15	0.0065
	Postgraduates-52	49	3	
	staff-51	51	0	
Gingival bleeding and dry mouth	Interns - 97	86	11	0.0085
	Postgraduates-52	52	0	
	staff-51	51	0	
Pain and swelling in mandible and salivary gland	Interns - 97	87	10	0.01
	Postgraduates-52	51	1	
	staff-51	51	0	
Fissured or depapillated tongue	Interns - 97	77	20	0.00085
	Postgraduates-52	51	1	
	staff-51	51	0	
Herpetiform lesions	Interns - 97	66	31	0.00652
	Postgraduates-52	46	7	
	staff-51	51	0	

Table 3

Questions	Parameter	Option1	Option2	Option3	Option4	Option5	P-value
Cause of covid-19	Interns-97	80	0	16	1	0	0.214
	Postgraduates-52	47	0	0	5	0	
	Staff- 51	48	0	3	0	0	
Cause of loss of taste and oral ulceration in covid19	Interns-97	6	10	1	80	0	0.125
	Postgraduates-52	2	1	0	49	0	
	Staff- 51	0	0	0	51	0	
Most common site	Interns-97	55	22	20	0	0	0.075
	Postgraduates-52	42	8	2	0	0	
	Staff- 51	51	0	0	0	0	
Intraoral findings	Interns-97	4	1	2	5	85	0.184
	Postgraduates-52	0	1	0	0	51	
	Staff- 51	0	0	0	0	51	
Predisposing factor	Interns-97	4	2	5	86	0	0.204
	Postgraduates-52	0	0	1	51	0	
	Staff- 51	0	0	0	51	0	
COVID testing	Interns-97	12	5	1	79	0	0.09888
	Postgraduates-52	1	0	0	51	0	
	Staff- 51	0	0	0	51	0	

Results

A total of 200 practicing dental professionals, interns, postgraduates, and staff of ages 23–56 years were included in the pilot study. From our results we found that 87.5% of the dental professionals believed that Covid-19 spreads through human-to-human contact, while other 12% of participants believed that it spreads through both humans to human and animal to human contact, only 0.5% of participants responded that Covid-19 spreads neither from human-to-human contact nor from animal to human contact. 97.5% of dental professionals are aware that oral manifestations of Covid-19 include oral ulcers and 2.5% of the participants are not aware. 91% of the dental

professionals are aware that oral manifestations of Covid-19 include vesicles and bullae while 9% of the participants are not aware. 94.4% of the participants knew that the high prevalence oral symptom of Covid-19 is dry mouth and gingival bleeding while 5.6% of dental professionals are not aware of it. About 90% of the participants knew that destruction of oral fibroblasts and destruction of keratinocytes causes the loss of taste and oral ulceration while 1% of the participants responded with the opposite thought.

94.5% of the dental professionals were aware of the fact that after Covid-19 patients may have pain and swelling in the mandible and salivary glands, while 5.5% were not aware of the same.

89.5% of the participants knew that Covid-19 may cause fissured or de-papillated tongue while 0.4% of the participants weren't aware of the same. 81.5% of the participants responded that oral manifestations of Covid-19 include herpetiform lesions while 18.5% of the participants didn't agree with this.

According to 73.5% of the participants, the tongue is the most common site for involvement for oral symptoms of Covid-19 whereas according to 15.5% of the participant's gingiva is the most commonly involved site, while 11% of them believed that palate is also a common site for involvement for oral symptoms of Covid.

According to 93.5%, intraoral findings in Covid-19 are white and erythematous plaques, irregular ulcers, small blisters, petechiae, and desquamative gingivitis, whereas for 2% lack of oral hygiene, and 1% opportunistic infection, 3% immunosuppression were the reasons. For 94% all of the given factors were the predisposing factors for the onset of oral lesions in Covid-19 patients.

90.5% of dental professionals believed that covid-19 testing can be done by nasal swab, throat swab, and gargles 6.5% believe that it can be done only by nasal swab, 2% say by throat swab and only 1% believe that Covid testing can only be done by gargles.

Discussion

From the analyzed data, COVID-19 patients have several types of signs and symptoms, so our study of these manifestations will contribute to the early diagnosis and isolation of the infected patient. Also, COVID-19 as an acute infection with multiple therapeutic measures could adversely affect oral health leading to opportunistic infections (e.g., recurrent herpes simplex virus (HSV-1) infection and oral ulcerations) due to the compromised immune system and xerostomia

associated with the reduced salivary flow. 81.5% are aware of covid-19 including herpetiform lesions.

About spreads of Covid-19 87.5% are aware, while rest were not aware there are several types of oral manifestations, concerning oral ulceration (17.2%), their prevalence was higher than other manifestations like ulceration and skin rash in COVID-19 patients. 97.5% of dental professionals were aware of these manifestations. Oral lesions included vesicular eruptions and erosions on the tongue and buccal mucosa. The effect of COVID-19 on salivary glands included pain or swelling in either parotid or submandibular areas (according to 94.5% of the participants), dry mouth (94.4%), gingivitis, and gingival bleeding.

Taste loss (ageusia) occurs due to the viral infection to the olfactory cranial nerve or from rhinitis and nasal obstruction. 90% knew that destruction of oral fibroblasts and destruction of keratinocytes causes the loss of taste and oral ulceration in Covid-19.

The prevalence of tongue redness, the geographic tongue, and ulceration are also seen in COVID-19 patients.^[21] According to 73.5% of the participants, the most common site for involved oral sites of Covid-19 is the tongue. For, 89.5% Covid-19 may cause fissured and de-papillated tongue.

Intraoral findings in Covid-19 are white and erythematous plaques, Irregular ulcers, small blisters, petechiae, and desquamative gingivitis according to 93.5% of dental professionals. About, 94% are aware of the predisposing factors of Covid-19.

Our study had certain limitations. First, the main methodological limitation is the limited sample size since this is a pilot study. Secondly, it was an online questionnaire-based study.

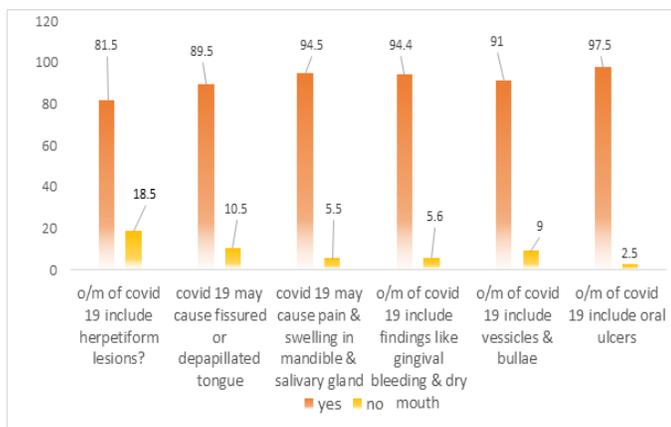
Conclusion

From the above results, we concluded that the dental professionals are aware of the intraoral findings among COVID 19 patients.

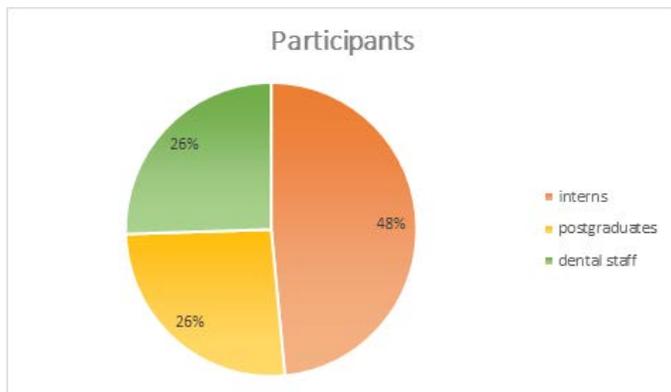
It is interpreted that the staff had maximum knowledge regarding Covid-19, followed by postgraduates whereas interns were not very clear with their concepts regarding the spread and oral manifestations of Covid-19.

The study has assessed the knowledge and awareness of the dentists of central India on a small scale.

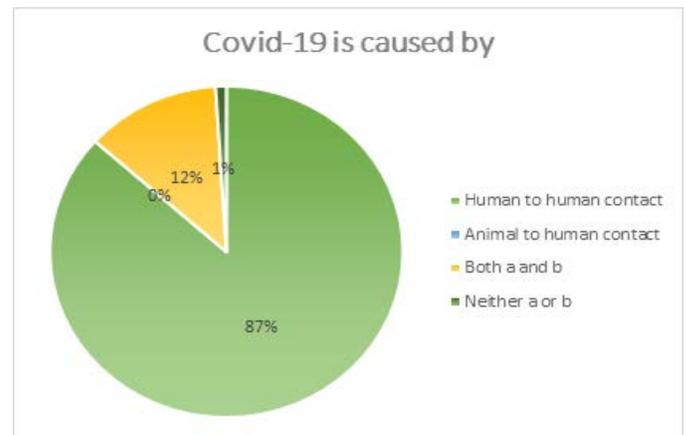
Graphical references of the collected data



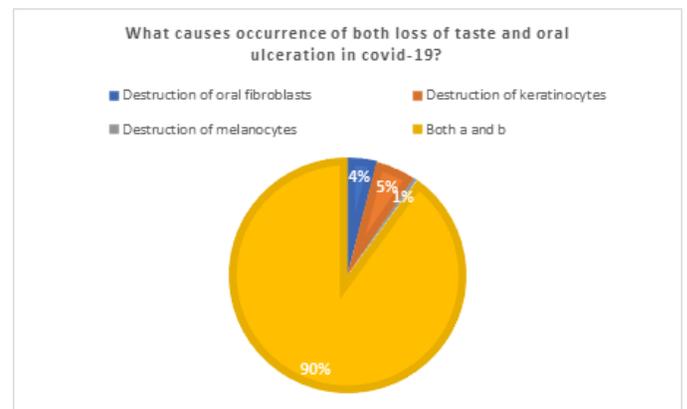
Graph 1



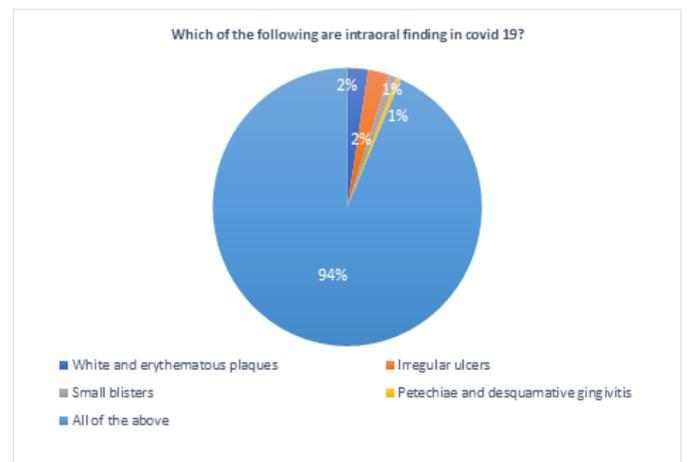
Graph 2



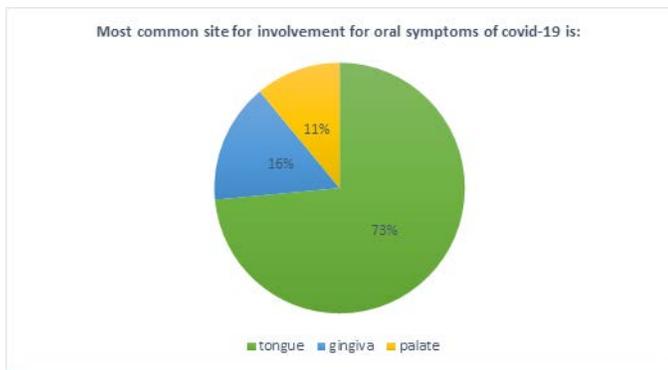
Graph 3



Graph 4



Graph 5



Graph 6

References

1. Nuno~ González A, Magaletskyy K, Martín Carrillo P, Lozano Masdemont B, Mayor Ibarguren A, Feito Rodríguez M, et al., Son las alteraciones en la mucosa oral un signo de COVID-19? Estudio transversal en un Hospital de Campana, ~ ACTAS DermoSifiliográficas, 2021;112:640--644.
2. C. Galván Casas, A. Català, G. Carretero Hernández, P. Rodríguez-Jiménez, D. Fernández-Nieto, A. Rodríguez-Villa Lario, I. Navarro Fernández, R. Ruiz-Villaverde, D. Falkenhain-López et al.: Classification of the cutaneous manifestations of COVID-19: a rapid prospective nationwide consensus study in Spain with 375 cases. doi: 10.1111/BJD.19163
3. Cascella M, Rajnik M, Aleem A, et al. Features, Evaluation, and Treatment of Coronavirus (COVID-19) [Updated 2022 Jan 5]. In: StatPearls [Internet]. Treasure Island (FL): Stat Pearls Publishing; 2022 Jan-. Available from: <https://www.ncbi.nlm.nih.gov/books/NBK554776/>
4. <https://www.who.int/emergencies/diseases/novel-coronavirus-2019?false=DalFox> [last assessed on 2022 January 15]
5. Baghizadeh Fini M. Oral saliva and COVID-19. Oral Oncol. 2020; 108:104821. doi: 10.1016/j.oraloncology.2020.104821
6. Atukorallaya DS and Ratnayake RK (2021) Oral Mucosa, Saliva, and COVID-19 Infection in Oral Health

- Care. Front. Med. 8:656926. doi: 10.3389/fmed.2021.656926
7. Zou L, Ruan F, Huang M, et al. SARS-CoV-2 Viral Load in Upper Respiratory Specimens of Infected Patients. N Engl J Med. 2020;382(12):1177-1179. doi:10.1056/NEJMc2001737
 8. Ciaglia E, Vecchione C and Puca AA (2020) COVID-19 Infection and Circulating ACE2 Levels: Protective Role in Women and Children. Front. Pediatr. 8:206. doi: 10.3389/fped.2020.00206
 9. Zhou P, Yang XL, Wang XG, et al. A pneumonia outbreak associated with a new coronavirus of probable bat origin. Nature. 2020;579(7798):270-273. doi:10.1038/s41586-020-2012-7
 12. Cruz Tapia RO, Peraza Labrador AJ, Guimaraes DM, Matos Valdez LH. Oral mucosal lesions in patients with SARS-CoV-2 infection. Report of four cases. Are they a true sign of COVID-19 disease? Spec Care Dentist. 2020;40(6):555-560. doi:10.1111/scd.12520
 13. Karia R, Gupta I, Khandait H, Yadav A, Yadav A. COVID-19 and its modes of Transmission. SN Compr Clin Med. (2020) 1-4. doi: 10.1007/s42399-020-00498-4. [Epub ahead of print].
 14. Shi H, Han X, Jiang N, Cao Y, Alwalid O, Gu J, et al. Radiological findings from 81 patients with COVID-19 pneumonia in Wuhan, China: a descriptive study. Lancet Infect Dis. (2020) 20:425-34. doi: 10.1016/S1473-3099(20)30086-4
 15. Xu XW, Wu XX, Jiang XG, Xu KJ, Ying LJ, Ma CL, et al. Clinical findings in a group of patients infected with the 2019 novel coronavirus (SARS-Cov-2) outside of Wuhan, China: retrospective case series. BMJ. (2020) 368:m606. doi: 10.1136/bmj.m606
 16. Freni F, Meduri A, Gazia F, Nicastro V, Galletti C, Aragona P, et al. Symptomatology in head and neck

district in coronavirus disease (COVID19): a possible neuro invasive action of SARS-CoV-2. *Am J Otolaryngol.* (2020) 41:102612. doi: 10.1016/j.amjoto.2020.102612

17. Lechien JR, Chiesa-Estomba CM, De Siaty DR, Horoi M, Le Bon SD, Rodriguez A, et al. Olfactory and gustatory dysfunctions as a clinical presentation of mild-to-moderate forms of the coronavirus disease (COVID19): a multicenter European study. *Eur Arch Otorhinolaryngol.* (2020) 277:2251–61. doi: 10.1007/s00405-020-06024-5

18. Lai C-C, Ko W-C, Lee P-I, Jean S-S, Hsueh P-R. Extra-respiratory manifestations of COVID-19. *Int J Antimicrob Agents.* (2020) 56:106024. doi: 10.1016/j.ijantimicag.2020.106024

19. Guo Y, Yuan C, Wei C. Emergency measures for acute oral mucosa diseases during the outbreak of COVID-19. *Oral Dis.* (2020) 2020:13350. doi: 10.1111/odi.13350

20. Meng X, Deng Y, Dai Z, Meng Z. COVID-19 and anosmia: a review based on up-to-date knowledge. *Am J Otolaryngol.* (2020) 41:102581. doi: 10.1016/j.amjoto.2020.102581

21. <https://onlinelibrary.wiley.com/doi/10.1111/scd.12520> [last assessed on 2022 January 15]

22. Scully C, Samaranayake LP. Emerging and changing viral diseases in the new millennium. *Oral Dis.* 2016;22(3):171-179. doi:10.1111/odi.12356

23. Amorim Dos Santos J, Normando AGC, Carvalho da Silva RL, et al. Oral mucosal lesions in a COVID-19 patient: new signs or secondary manifestations? *Int J Infect Dis.* 2020; 97:326-328. doi: 10.1016/j.ijid.2020.06.012.