



COVID Tongue: Reports, Debate, and Scope for Research

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Dental and medical doctors well report the oral manifestations of coronavirus disease 2019 (COVID-19) infection. Knowledge of oral manifestations also provides a scope for detecting asymptomatic or presymptomatic COVID-19 patients. Predominant reports stated dry mouth, loss of taste sensation, and oral ulcerations.^{1,2} Recently, an article has reported specific changes observed in the tongue during COVID-19 infection as “COVID tongue.” The first article published by Hathway appears to document the first report on “COVID tongue” in PubMed literature.³ Reports also suggested that the appearance of the COVID tongue shall be considered a preliminary sign of COVID-19 infection. Recently, an article stated that tissue changes observed in the tongue are related to viral replication due to higher expression of angiotensin-converting enzyme-2.⁴

The changes in the COVID tongue shall be related to the geographic tongue or benign migratory glossitis. In the case of symptomatic geographic tongue, the term of migratory stomatitis is used.⁵ It is interesting to note that various studies on COVID-19 infection stated that geographic tongue is an oral presentation. The studies that documented tongue changes in the COVID-19 condition are listed in ▶Table 1.

The geographic tongue is characterized by the depapillation of the tongue's dorsum and lateral surfaces, leading to an erythematous appearance with white-border surroundings.⁶ The areas of depapillation can heal and spontaneously occur in other regions of the tongue, hence the term “migratory glossitis” was used. It is well-known that geographic tongue

can also be seen as sporadic cases without significant ill-health changes. Then, the following report by Scotto et al that the term COVID tongue in clinical sign called tongue depapillation, none of these had the geographic tongue characteristic.⁷ The unique characteristic was that depapillation can heal and spontaneously occur in other regions.

On the other hand, the geographic tongue is classified according to the activity and severity of the lesion. There are two classifications: active geographic tongues with lesions that have well-demarcated white or red borders (▶Fig. 1A–D) and passive geographic tongues with lesions without whitish borders but still have depapillated areas (▶Fig. 1E–G).⁸ The differences in thickening white margins reflected increased activity and severity.⁹ Although the migratory condition is not found and observed in COVID-19 cases, the thing that is definitely reported was tongue depapillation (▶Fig. 1H).

The tongue changes are debatable due to inconsistency in presentation among COVID-19 patients. Specifically, the clinical appearance of geographic tongue in non-COVID-19 patients and COVID-19 patients is unable to be differentiated. But the symptoms, management, and predisposing factor are able to differentiate (▶Table 2). Although oral manifestations of COVID 19 are not fully established, clinicians should be updated on the changes of the tongue that may be seen in a few COVID-19 patients. Recent research showed that the tongue condition should be recommended for COVID-19 screening.¹⁰ It is challenging for a dentist, oral medicine specialist, or general medical practitioner to

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Table 1 Studies/case reports that documented tongue changes in COVID-19 infection

Age	Gender	Reported changes of tongue	Associated symptoms	Medical status of patient	Management	Reference
70	Female	Geographic tongue Erythematous candidiasis	–	–	–	Riad et al, 2021 ¹⁵
12 cases		Depapillation on dorsum of tongue	–	–	–	Nuño González et al, 2021 ¹⁶
43	Female	Geographic tongue (dorsum)	Burning sensation, aphthous-like lesions	–	–	Rodríguez et al, 2022 ¹⁷
67	Male	Geographic and fissured tongue	White plaque changes, multiple pin head sized yellow-colored ulcers resembling herpetic ulcers	Hospitalized patient	Fluconazole and nystatin. The lesion healed in 2-week period	Amorim dos Santos et al, 2020 ¹⁸
37	Female	Depapillation and diffuse erythematous changes on lateral surface of tongue	Mucositis	–	–	Tomo et al., 2022 ¹⁹
50	Female	Depapillation in lateral and dorsum area	Pain and burning sensation		Injection of triamcinolone acetonide 40 mg/mL	Lombardi et al, 2022 ²⁰
3 cases		Depapillation		Hospitalized patient	–	Villarroel-Dorrego et al, 2022 ²¹

Abbreviation: COVID-19, coronavirus disease 2019.

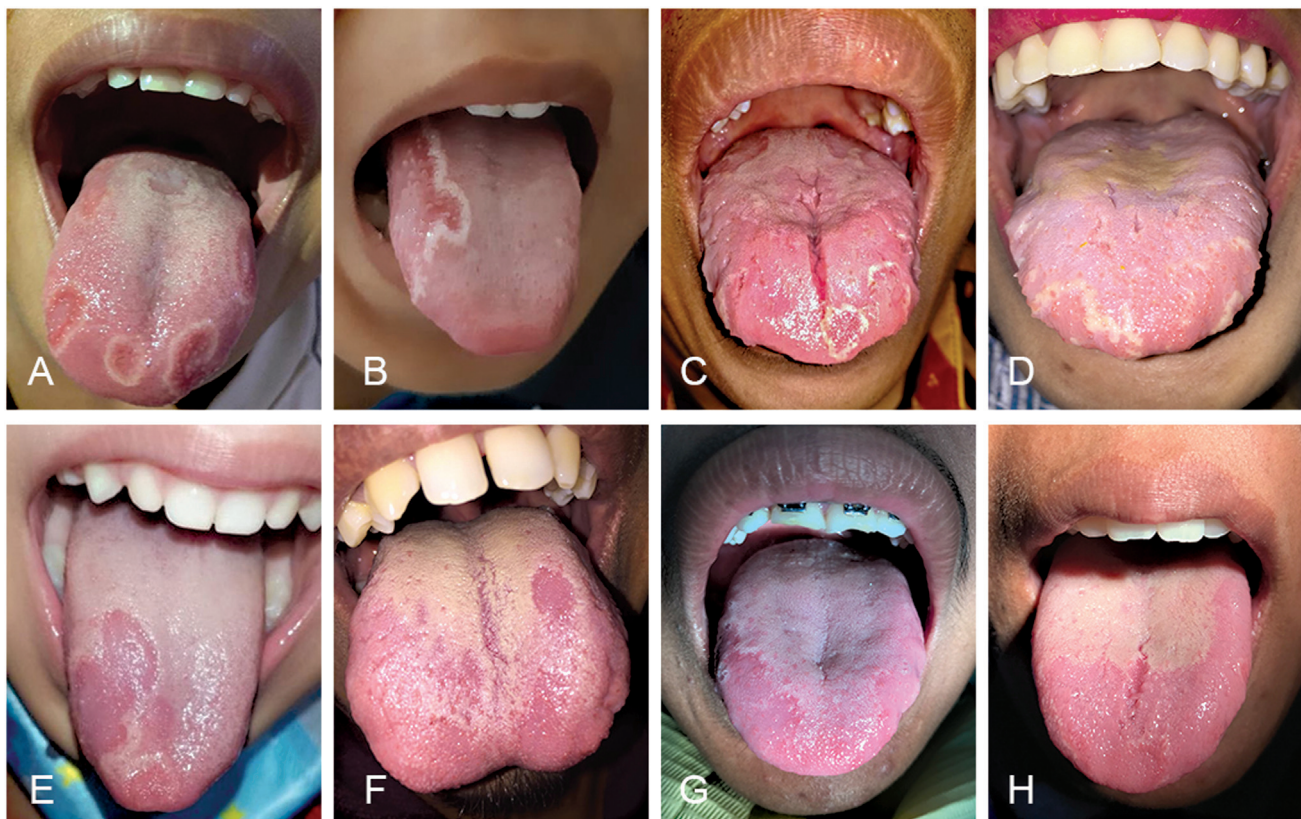
**Fig. 1** The active geographic tongue (A–D), passive geographic tongue (E–G), and tongue depapillation (H).

Table 2 The differences between geographic tongue and COVID tongue

Aspect	Geographic tongue	COVID tongue
Symptoms	Not associated with burning sensation	Cases reported with pain and burning sensation similar to mucositis and aphthous ulcerations
	No altered taste sensation or loss of taste sensation	Loss of taste sensation
	Moistness of tongue remains unaffected	Reported dryness of mouth in COVID patients
Clinical	Appears as diffuse areas of erythematous appearance surrounded by a thin and faint white margin.	Erythematous areas over dorsum and lateral surface of tongue
	Depapillation on dorsal and lateral surface of tongue	Diffuse areas of depapillation of tongue
	Erythematous areas of the tongue will be migrating over period of time	No migrating pattern
Predisposing factor	Geographic tongue can be seen as isolated cases and associated with vitamin deficiencies, stress, psoriasis, eczema, and other autoimmune-related dermatological conditions	No reports of associated medical conditions are noted
Management	No specific line of management Vitamin B complex in few cases were reported	Reports stated about antifungal medication management

Abbreviation: COVID, coronavirus disease.

differentiate between COVID-19 association, isolated geographic tongue, or an oral manifestation of the medical condition. It is well-documented that geographic tongue is associated with genetic changes,¹¹ allergies,⁸ hormonal,¹² vitamin, or micronutrient deficiencies,⁸ psoriasis,¹³ medications, and smoking.⁸ Association of geographic tongue among psoriasis is not observed in all patients. The studies have documented strong association of human leukocyte antigen (HLA) CW6 among geographic/fissured tongue changes in psoriasis patients.¹⁴ Similarly, future studies should focus on any association of HLA among COVID-19 patients for the occurrence of tongue changes. Although the mechanism of geographic tongue in COVID-19 is still not precise, dentists, oral medicine specialists, or general medical practitioners should ask their patients while taking a history of illness “whether any changes in the appearance of the tongue have been recently noted.”

Ethical Approval

The ethical approval or consent statement is not required in this study.

Conflict of Interest

None declared.

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