

# Geographic tongue, fissured tongue, and angular cheilitis associated with the diagnosis of psoriasis in adult patients: a cross-sectional study

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## ABSTRACT

**Objective.** This work aimed to determine the frequency of geographic tongue, fissured tongue, and angular cheilitis associated with the diagnosis of psoriasis in adult patients.

**Material and methods.** This was a cross-sectional study and was conducted between February and April 2023, including a total of 120 adult patients (60 with psoriasis and 60 without psoriasis) from the Dermatology Service at "Victor Lazarte Echegaray" Hospital. To determine the intra- and inter-rater reliability of the oral clinical measurement, a pilot study was conducted with 22 participants, resulting in Kappa values above 0.91. On the other hand, the diagnosis of psoriasis was made by a dermatology specialist. The Chi-square test was used to analyze results, considering a significance level of 5%.

**Results.** Frequency of fissured tongue was associated with the diagnosis of psoriasis ( $p=0.023$ ); this association also was found in patients aged 35 to 64 years ( $p=0.020$ ), nail psoriasis ( $p=0.037$ ) and late-onset psoriasis ( $p=0.03$ ).

**Conclusions.** The fissured tongue is associated with diagnosing psoriasis, mainly in patients in the 35-64 age group and with nail psoriasis and late-onset psoriasis.

**Keywords:** psoriasis, oral manifestations, fissured tongue, benign migratory glossitis, cheilitis

## INTRODUCTION

Oral mucosal lesions may appear as color, size, and structure changes [1]. Some of these lesions occur on

the tongue, essential in taste perception, speech, swallowing and chewing. Moreover, the color, appearance, shape, texture, and coating of the tongue are good indi-

cators of the systemic state in individuals and may aid in the diagnosis of certain systemic diseases [2].

Geographic tongue (GT), or benign migratory glossitis, is an immune-mediated chronic inflammatory condition of the tongue with an unknown etiology [1,3,4]. It has a 1 to 2.5% prevalence, more likely in adults than children [1,3]. Clinically, the lesion appears as a central atrophic area delimited by white borders, mainly affecting the filiform papillae. The lesions vary in size and remain briefly in one area of the tongue, then disappear and reappear in another area. Histologically, it presents neutrophilic exocytosis and spongiotic pustules in the superficial epithelium, which are features similar to psoriasis [3-5]. It has been associated with this systemic disease and is considered an oral and severity marker of this dermatosis [4].

Fissured tongue (FT), or scrotal tongue, is a normal variant of the tongue surface that occurs more frequently in males and increases with age [6]. It is generally asymptomatic and has a 20-30% prevalence [2]. Clinically, it is characterized by longitudinal grooves on the dorsum of the tongue and sometimes with lateral furrows that vary in depth. It does not require treatment unless there is local irritation or bacterial overgrowth [5]. Multiple studies have shown that it does not become malignant and is associated with various systemic pathologies such as psoriasis [2].

Angular cheilitis (AC) is an inflammation of the labial angle. Clinically, it is characterized by erythema, ulcerations, fissures, and scabs in the oral commissures and adjacent skin, which can be unilateral or bilateral. The etiology of CA is varied and can be caused by local and systemic factors. Studies indicate that some autoimmune diseases could be a risk factor for this condition, as well as some medications, such as secukinumab, due to their ability to suppress the proliferation and differentiation of keratinocytes [7]. Reduction of the vertical dimension due to edentulism or ill-fitting dentures, weight loss, malnutrition, and smoking habits can be local causes or make this pathology worse [8].

Psoriasis is an immune-mediated chronic inflammatory skin disease [9,10] that affects about 2 to 3% of the world population. It starts when the immune system attacks skin cells, disrupting their regular lifespan and its development cycle [11-14]. It affects both men and women equally, although recent studies report a greater severity of the disease in men [15]. It can occur at any age; however, it appears more frequently in people aged 18 to 39 and 50 to 69 [12,16].

Psoriasis manifests itself in multiple ways: in plaques, inverse, guttate, pustular, and erythrodermic psoriasis. The most common type of psoriasis is plaque psoriasis, also known as psoriasis vulgaris, which is characterized by the presence of well-defined salmon pink plaques with white scales, usually with a symmet-

rical distribution and affecting the extremities, trunk, and scalp [11].

The scalp is the area of the body most affected by psoriasis, and its symptoms include pain and itching, having a major psychosocial implication [17]. Approximately 90% of psoriatic patients develop nail psoriasis during their lifetimes, unrelated to gender or age [18].

Inverse psoriasis represents a variant of plaque-type psoriasis, affecting the folds, most often the armpits, the anogenital fold, and the inframammary fold, and it can also be found in the antecubital and popliteal fossa and interdigital spaces [19]. Erythrodermic psoriasis is a rare and severe variant of psoriasis and is treated as a dermatological emergency, due to it can be associated with electrolyte balance disturbances and scaling that can jeopardize the life of the patient [12]. Gouty psoriasis is a subtype of psoriasis characterized by an acute eruption of numerous small, erythematous plaques and papules [20]. In most cases, it has a spontaneous resolution [12].

Considering the limited number of studies that show oral manifestations in patients diagnosed with psoriasis, this study intends to contribute and seek to provide useful information for dentists and dermatologists in order to create strategies for interdisciplinary clinical management. In this regard, this study aimed to determine the frequency of geographic tongue, fissured tongue, and angular cheilitis associated with the diagnosis of psoriasis in Peruvian adult patients.

## MATERIAL AND METHODS

This cross-sectional observational study was conducted in “V́ctor Lazarte Echegaray” Hospital - EsSalud, between February and April 2023.

The sample consisted of 120 patients, 60 with psoriasis and 60 without psoriasis. It was calculated by using the comparison of proportions formula for an unknown population, using data generated by a pilot study of 22 people (11 with psoriasis and 11 without psoriasis) and with the following parameters: type I error ( $\alpha=0.05$ ), confidence level ( $1-\alpha/2=0.975$ ), Z at 0.5% type I error ( $Z_{1-\alpha/2}=1.96$ ), type II error ( $\beta=0.1$ ), statistical power ( $1-\beta=0.8$ ), Z at 10% type I error ( $Z_{1-\beta}=0.842$ ), proportion of fissured tongue in patients without psoriasis ( $p_1=0.545$ ), proportion of fissured tongue in patients with psoriasis ( $p_2=0.018$ ) and average prevalence ( $p=0.682$ ). The sample was selected by using the accidental non-probabilistic method.

The patients included in the study were divided into two groups: the group with psoriasis were patients over the age of 18 years who attended outpatient clinics at the Dermatology Service of the “V́ctor Lazarte Echegaray” Hospital, with a clinical diagnosis of psoriasis that a specialist of the service mentioned above performed,

they presented active lesions of the disease at the time of evaluation. On the other hand, the group without psoriasis were patients over 18 who attended the outpatient clinic of the same service for any other dermatosis. Pregnant patients, HIV-positive patients, diabetic patients, users of dentures in poor condition, patients with decreased occlusal vertical dimension, and patients who did not agree to participate in the study were excluded.

This study was approved by the Faculty of Human Medicine (Res. N°0196-2023-FMEHU-UPAO), the Bioethics Committee of the Antenor Orrego Private University (Res. Bioethics Committee N° 0059-2023-UPAO), and the Training Directorate of La Libertad - ESSALUD Healthcare Network (RI N° 42 CIYE-O.C.I. Y D-RALL-ESSALUD-2023). These operational units strictly adhere to the principles established in the Declaration of Helsinki of the World Medical Association and the General Health Law of Peru N°26842.

Before participating in this study, all patients received information about the purpose of the research. Then, when they agreed to participate, they were given an informed consent form to read and sign. Finally, the clinical evaluation was conducted.

The principal researcher evaluated the presence of oral manifestations using a "Data collection form" where the basic demographic data and the variables under study were collected. The reliability of the measurement method was determined through intra- and inter-rater calibration, with the support of an expert who is a specialist in Oral and Maxillofacial Surgery and a professor at the "Antenor Orrego" Private University for 17 years. The measurement was carried out with 22 patients, estimating significant reliability with a Kappa value of 0.936 in the intra-rater measurement and a Kappa value of 0.914 in the inter-rater measurement.

The collected data were processed automatically using SPSS Statistics 26.0 (IBM, Armonk, NY, USA). Absolute and percentage frequencies were considered using the Chi-square test with a significance level of 5%. The results are shown in tables that include the mean, standard deviation, and range of uni- and bivariate analysis. Oral manifestations were compared in the group with and without psoriasis, considering gender and age group. Furthermore, the psoriasis group was evaluated according to the clinical form of the disease and the time of its onset.

## RESULTS

In this study, 120 patients were evaluated, ranging from 18 to 90 years ( $\bar{x}$ = 56.88;  $\sigma$ =16.07), with no statistical difference between the age groups ( $p$ =0.579 >0.05). 60 patients with psoriasis and 60 without psoriasis (18 women and 42 men in each group;  $p$ =1.00

>0.05) were included. In this sense, the groups were considered comparable for the analyses, and the following results were obtained.

As Table 1 shows, there was an association between the frequency of fissured tongue and the diagnosis of psoriasis ( $p$ =0.023). However, there was no association between psoriasis and geographic tongue ( $p$ =1.000) or angular cheilitis ( $p$ =0.255).

**TABLE 1.** Oral manifestations associated with the diagnosis of psoriasis in adult patients

Oral manifestations	Psoriasis				X <sup>2</sup>	p
	Yes		No			
	No	%	No	%		
Fissured tongue	44	73.3	32	53.3	5.167	0.023
Geographic tongue	1	1.7	1	1.7	0.000	1.000
Angular cheilitis	9	15.0	5	8.3	1.294	0.255

N°: number of patients, %: percentage of patients, X<sup>2</sup>: Chi-square test of independence of criteria, p: significance level

Table 2 shows that, according to gender, there was no association between the presence of the oral manifestations studied and psoriasis. On the other hand, regarding age, an association was only found between patients with psoriasis in the 35 to 64-year-old age group and the frequency of fissured tongue ( $p$ =0.020).

Concerning the clinical form of psoriasis, Table 3 shows that fissured tongue was associated with nail psoriasis ( $p$ =0.037). However, there was no association between the different oral manifestations studied and the other clinical forms of the disease.

As shown in Table 4, there was an association between the frequency of fissured tongue and the late onset of the disease ( $p$ =0.03). On the other hand, there was no association between psoriasis and geographic tongue ( $p$ =0.809) or angular cheilitis ( $p$ =0.683).

## DISCUSSION

Oral lesions in patients diagnosed with psoriasis are understudied and underdiagnosed diseases by health specialists. According to several sources, these lesions are called oral psoriasis because, histologically, they are similar to systemic psoriasis and have shared clinical manifestations with the disease [13].

In this investigation, an association was found between the fissured tongue and the diagnosis of psoriasis. Similar results were reported by Altémir et al, [13] Monshi et al., [5] Olejnik et al., [15] Tomb et al., [21] and Hernández-Pérez et al. [22]. In addition, the results were similar to those found by Monshi et al. [5] and Hernández-Pérez et al., [22] corresponding to the geo-

**TABLE 2.** Oral manifestations associated with the diagnosis of psoriasis in adult patients according to gender and age group

Features	Oral manifestations		Psoriasis				X2	p
			Si		No			
			No	%	No	%		
Gender	Women	Fissured tongue	11	18.3	7	11.7	1.778	0.182
		Geographic tongue	0	0.0	0	0.0		
		Angular cheilitis	1	1.7	1	1.7	0.000	1.000
	Men	Fissured tongue	33	55.0	25	41.7	3.565	0.059
		Geographic tongue	1	1.7	1	1.7	0.000	1.000
		Angular cheilitis	8	13.3	4	6.7	1.556	0.212
Age	18-34 years old	Fissured tongue	0	0.0	2	3.3	0.216	0.134
		Geographic tongue	0	0.0	0	0.0		
		Angular cheilitis	1	1.7	0	0.0	0.045	0.833
	35-64 years old	Fissured tongue	27	45.0	15	25.0	5.399	0.020
		Geographic tongue	1	1.7	0	0.0	0.000	1.000
		Angular cheilitis	5	8.3	1	1.7	1.181	0.277
	65+ years old	Fissured tongue	17	28.3	15	25.0	1.633	0.201
		Geographic tongue	0	0.0	1	1.7	0.000	1.000
		Angular cheilitis	3	5.0	4	6.7	0.000	1.000

N°: number of patients, %: percentage of patients, X2: Chi-square test of independence of criteria, p: significance level

**TABLE 3.** Oral manifestations associated with the diagnosis of psoriasis in adult patients, according to the clinical form

	Oral manifestations	The clinical form of psoriasis				X2	p
		Yes		No			
		No	%	No	%		
Psoriasis in drops	Fissured tongue	12	75.0	32	72.7	0.031	0.860
	Geographic tongue	0	0.0	1	2.3	0.000	1.000
	Angular cheilitis	3	18.8	9	20.5	0.007	0.935
	Total	16	26.7	44	73.3		
Plaque psoriasis	Fissured tongue	41	75.9	3	50.0	0.767	0.381
	Geographic tongue	1	1.9	0	0.0	0.000	1.000
	Angular cheilitis	9	16.7	0	0.0	1.176	0.278
	Total	54	90.0	6	10.0		
Nail psoriasis	Fissured tongue	10	100.0	34	68.0	4.634	0.037
	Geographic tongue	0	0.0	1	2.0	0.000	1.000
	Angular cheilitis	3	30.0	6	12.0	2.118	0.146
	Total	10	16.7	50	83.3		
Erythrodermic psoriasis	Fissured tongue	1	33.3	43	75.4	0.879	0.348
	Geographic tongue	0	0.0	1	1.8	0.000	1.000
	Angular cheilitis	1	33.3	8	14.0	0.007	0.934
	Total	3	5.0	57	95.0		
Inverse psoriasis	Fissured tongue	1	100.0	43	72.9	0.000	1.000
	Geographic tongue	0	0.0	1	1.7	0.000	1.000
	Angular cheilitis	0	0.0	9	15.3	0.007	0.934
	Total	1	1.7	59	98.3		
Pustular psoriasis	Fissured tongue	1	33.3	43	75.4	0.879	0.348
	Geographic tongue	0	0.0	1	1.8	0.000	1.000
	Angular cheilitis	1	33.3	8	14.0	0.007	0.934
	Total	3	5.0	57	95.0		
Sebopsoriasis	Fissured tongue	1	50.0	43	74.1	0.000	1.000
	Geographic tongue	0	0.0	1	1.7	0.000	1.000
	Angular cheilitis	1	50.0	8	13.8	0.162	0.687
	Total	2	3.3	58	96.7		

N°: number of patients, %: percentage of patients, X2: Chi-square test of independence of criteria, p: significance level

**TABLE 4.** Oral manifestations associated with the diagnosis of psoriasis in adult patients, according to the onset of the pathology

Oral manifestations	Onset psoriasis				X2	p
	Early psoriasis		Late psoriasis			
	No	%	No	%		
Fissured tongue	12	52.2	32	86.5	8.539	0.003
Geographic tongue	1	4.3	0	0.0	0.059	0.809
Angular cheilitis	4	17.4	5	13.5	1.670	0.683

N°: number of patients, %: percentage of patients, X2: Chi-square test of independence of criteria, p: significance level

graphic tongue and angular cheilitis, respectively. However, Costa et al., [8] and Tomb et al., [21] found that angular cheilitis and geographic tongue were associated with psoriasis, probably because the sample size used by the latter investigators was larger.

Gender-wise, there was no association between the oral manifestations studied and the diagnosis of psoriasis. This may be due to the fact that gender was a secondary variable in this study, requiring an increase in the sample size proportionally between men and women to obtain definitive conclusions.

Regarding the age group, there was an association between fissured tongue and psoriasis diagnosis in patients aged 35 to 64 years. In patients older than 65, there was also an association with the fissured tongue; however, there was no association with psoriasis. According to some studies, this may be because the incidence of fissured tongue increases with age [6].

It was also found that fissured tongue was associated with the clinical form of nail psoriasis, results that differed from those of Altemir et al. [13] and Tomb et al. [21], who found that fissured tongue was an association between plaque psoriasis and pustular psoriasis, respectively. This is possibly due to the fact that the population studied for each clinical form of the disease was not proportional.

According to the onset time of psoriasis, it was found that the fissured tongue was associated with a late onset of the disease, which coincides with Picciani et al. [23] and Picciani BL, Silva-Junior GO et al. [24]. This finding can be attributed to the fact that fissured tongue is probably a late and more permanent expression of psoriasis, according to these authors [24].

As a cross-sectional study, this work does not allow the identification of a temporal sequence among the variables. Furthermore, in the present study, patients were not matched according to methotrexate consumption due to the high number of psoriatic patients who consume it. This medication, an analog of folic acid, is widely prescribed in this type of autoimmune disease and can promote the appearance of skin ulcerations [25]. This is why it is recommended to carry out future studies with a larger sample size to match patients according to the consumption of this drug and, in addition, consider the covariates presented in a multivariate analysis, which allows increasing the power of

the conclusions. Despite these limitations, this work is helpful because it provides interesting preliminary epidemiological data, allowing for future analytical studies.

## CONCLUSION

Oral manifestations in psoriasis should be studied and considered in diagnosing and managing the disease, as they are common in this group of patients [13]. Therefore, it is important to promote training for dentists and dermatologists so that the management of the disease is interdisciplinary, improving the effectiveness of treatment and the quality of life of patients.

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The authors declare that this work was self-financed and no conflict of interest exists.

### *Ethics approvals:*

To carry out this work, approval was obtained from the Faculty of Medicine (Res. N° 0196-2023-FME-HU-UPAO), the Antenor Orrego Private University Bioethics Committee (Res. Bioethics Committee N°0059-2023-UPAO) and the Training Directorate of the La Libertad Assistance Network – ESSALUD ((RI N°42 CIYE-O.C.I. Y D-RALL-ESSALUD-2023)). These operational units observed strict compliance with principles established in the Declaration of Helsinki of the World Medical Association and the General Health Law of Peru No. 26842.

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### *Author's contributions:*

Conceptualization: A.B-P, A.S.A-A and L.A.B-C; Formal analysis: A.B-P, A.S.A-A and C.A.M-M; Investigation: A.B-P, A.S.A-A and L.A.B-C; Methodology: A.S.A-A, L.A.B-C, and J.V.C-B; Project administration: A.S.A-A; Resources: A.S.A-A and L.A.B-C; Supervision: A.S.A-A and L.A.B-C; Validation: A.S.A-A; Visualization: A.S.A-A and C.A. M-M; Writing - original draft: A.B-P, A.S.A-A, J.V.C-B; Writing - review & editing: A.B-P, A.S.A-A, L.A.B-C, J.V.C-B and C.A.M-M



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