



ISSN Print: 2394-7489  
ISSN Online: 2394-7497  
IJADS 2021; 7(2): 147-154  
© 2021 IJADS  
www.oraljournal.com  
Received: 05-01-2021  
Accepted: 16-02-2021

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## Prevalence association of fissured tongue with the most common medical conditions in a sample of Libyan population: A cross-sectional study

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DOI: <https://doi.org/10.22271/oral.2021.v7.i2c.1201>

### Abstract

**Background:** Fissured Tongue (FT) is a benign asymptomatic disorder manifested with grooves that can vary in size and depth on the dorsum of the tongue. The prevalence of FT worldwide has been reported to be as high as 30.5%.

**Aim:** The present study was designed to determine the prevalence of FT among the Libyan population and also to evaluate its association with age, gender, burning symptoms and some medical conditions.

**Materials and Methods:** Patients attending The Department of Oral Medicine and Diagnosis at Tripoli Dental Services Center, Ministry of Health, Tripoli-Libya. The patients were examined for the presence of FT over one year.

**Statistical analysis:** Chi-square test was done to assess the correlation of FT with age, gender, burning sensation and some medical conditions.

**Result:** The prevalence of FT among Libyan patients was found to be as high as (37.9%). The most frequent type of FT seen was in mild type. Geographic Tongue (GT) revealed high association with FT ( $P < 0.001$ ). Diabetes Mellitus (DM) (6.1%) was the most frequent medical condition in subjects with fissured tongue, followed by hypertension (3.5%).

**Conclusion:** FT among the Libyan population revealed a higher prevalence. FT was most prevalent in the 40- 59 age group and more common in females. A high significant association was found between the occurrence of FT and GT. There was a significant association of FT with some medical conditions particularly DM.

**Keywords:** Prevalence, Libyan population, FT, medical conditions, associated oral lesions

### Introduction

Fissured tongue (FT) is a rare inherited disorder where the tongue has deep grooves which can vary in size and depth<sup>[1]</sup>. FT is also known as a scrotal tongue, lingua plicata, plicated tongue or furrowed tongue<sup>[2]</sup>. A definite aetiology does not exist but a polygenic mode of inheritance is postulated<sup>[3]</sup>. Local factors implicated in the aetiology are ill-fitting prosthesis, infection, parafunctional habits, allergic reaction, xerostomia, galvanism, and so forth<sup>[4]</sup>. Systemic factors concerned with burning sensation include medication, anaemia, oesophageal reflux, deficiency of vitamin B complex, zinc, iron and psychological factors<sup>[5]</sup>. FT was the most prevalent anomaly of oral soft tissues<sup>[6]</sup>. The prevalence of FT worldwide has been reported to be as high as 30.5%<sup>[7]</sup>. The Libyan population had an even higher prevalence of 48.4%<sup>[8]</sup>. The FT condition may be seen at any age, but generally affects older people more frequently<sup>[9]</sup> and it increases with age in both genders<sup>[10]</sup>. This can be explained by the fact that increasing age is associated with hyposalivation, which is one of the prime contributing factors<sup>[11]</sup>. In general, FT was reported to be more prevalent among men than in women<sup>[12]</sup>. The clinical appearance is considerably varied in orientation, number, depth and lengths of the fissure pattern<sup>[13]</sup>. The depth of the fissures ranges from 2 mm up to 6 mm<sup>[14]</sup>. These grooves become a storehouse for bacterial and fungal micro-organisms leading to secondary infections, halitosis, and focal glossitis<sup>[15]</sup>. Extensive furrows can be connected with each other making the tongue look like composed of separate lobes<sup>[16]</sup>.

The condition is usually asymptomatic, but some patients may complain of mild pain [17]. FT was categorized into two types: (i) FT with normal filiform papillae. (ii) FT syndrome; where fissures are associated with GT [18]. FT is found in many normal persons, and often in people with Down's syndrome or Melkersson- Rosenthal syndrome [19]. Recently, FT is classified broadly under three categories: Based on pattern, number and associated symptoms [20]. Differential diagnoses of scrotal tongue are amyloid infiltration, GT, lymphedema, lymphangioma, macroglossia, mucosal neuroma, and syphilitic glossitis [21]. Diagnosis of FT is made on the basis of clinical examination and biopsies are rarely taken [22]. However in a chronic smoker with long standing deep fissure, biopsy is mandatory to rule out any underlying malignant pathology [23]. On the treatment front, FT being a benign condition, no specific treatment is indicated [24] except proper oral hygiene maintenance with cleaning of the tongue to prevent candidal superimposition [25].

### Materials and Methods

The present cross-sectional study was conducted at Tripoli Dental Services Center/Ministry of Health, Tripoli – Libya. A random sample of 1210 patients attended the dental clinics over one year from November 2019 to December 2020. Permission from the ethics committee and written in typed consent of the dental service center was obtained before the study. Personal history: age, gender and detailed dental, as well as medical history, were registered. Examination of the oral cavity particularly the presence of FT and associated lesions according to world health organization guidelines was done by the co-authors who were specialist in oral pathology, oral medicine and oral and maxillofacial surgery. According to the newer Classification System by Sudarshan for FT and based on fissures number FT can be classified into mild type (Presence of 1 to 3 fissures), Moderate type (Presence of 4 to 10 fissures) and severe type (Presence of more than 10 fissures). The collected data was then tabulated and sent for statistical analysis using Microsoft Excel (Microsoft Office 2013) and SPSS® 21 (IBM, USA) to describe the quantitative data, mean and standard deviation were used. The cross-tabulation tables, bar and pie charts were used to describe the qualitative data. Chi-square test was done to assess the correlation of FT with age, gender, burning symptoms and some medical conditions. A *P value* < 0.05 was considered to be statistically significant.

### Results

Among the randomly collected study sample of 1210 patients, 459 cases of the patients showed to have FT lesion, most commonly occurred over two-third of the dorsal tongue. The prevalence of FT was (37.9%) (Fig1).

The age range of patients was (2 to 86 years) with a mean age of about 36 years. The ages of the subjects were categorized into four groups (< 20, 20-39, 40-59, ≥ 60) Overall, the prevalence of FT was found significantly higher in the 40-59 years-old (40.5%) (*P* < 0.001). On the other hand, FT was found to be least in both the < 20 years (12.4%) and ≥ 60 years (12.6%) (Fig. 2) (Table 1).

Among the subjects of the study sample, the prevalence of FT in females was 262 case (57.1%) and males 197 cases (42.9%) and was thus considerably higher in females. The difference was found to be statistically not significant *P* = 0.29 (Fig. 3) (Table 2). The general male to female ratio of FT in the study sample was 1:1.3.

The most frequent type of FT seen in the entire study sample

was the mild type (26.4%) followed by moderate type (6.4%) and severe type (5.2%) respectively (Fig. 4a-c and Fig. 5). The distribution of FT types in males and female was not statistically different (*P* =0.46). A severe type of fissured tongue (49.2%) was high among 40-59 age group, no cases with severe type were found in < 20 age group, FT type was less likely to be mild in ≥ 60 age group. However, the difference in the distribution of FT types among age groups was statistically significant (*P* = 0.009) (Fig. 6).

Among 459 subjects with FT 444 were asymptomatic (96.7%) and 15 were symptomatic (3.3%), therefore the majority of subjects with FT had no burning sensation symptom. Furthermore, all subjects with burning sensation symptom had FT. This made the burning sensation significantly associated with FT and not the opposite (*P* < 0.001) (Table 3). On the other hand, burning sensation complaint related to FT lesion was more common in female (86.7 %) than male (13.3 %) and this difference in distribution was statistically significant (*P* =0.03) (table 4).

The most frequent other oral lesion detected in the studied sample was GT 15 cases (1.2%) followed by median rhomboid glossitis (MRG) 4 (0.3%), respectively. All of these cases had FT which revealed a high association with FT (*P* < 0.001) (Fig. 7a and b) (Fig.8).

The majority of subjects with FT did not have medical conditions 396 (86.3%) Although the presence or absence of FT significantly associated with the presence of the medical condition, the percentage of FT increased significantly when the subjects had medical conditions (*P* < 0.001) (Table 5). DM 28 cases (6.1%) was the most frequent medical conditions in subjects with FT, followed by hypertension 16 cases (3.5%), and then both DM and hypertension together 6 cases (1.3 %) (Fig. 9).

### Discussion

The present study aimed to determine the prevalence of FT and also to evaluate the possible association between the occurrence of FT with age, gender, burning symptoms and some systemic diseases.

A variable range of prevalence rates has been reported in different parts of the world and different results have been obtained [22]. The prevalence of FT in our study was as high as (37.9%) but less than the study has been done on Libyan patients by Byahatti and Ingafou 2010, [26] who reported that the prevalence of FT was (48%). At the same time, our study prevalence was higher than many previously reported studies. These variations in the prevalence rate may be due to difference in sample sizes, variation in the criteria used to identify and classify fissures of the tongue. Nevertheless, the Libyan population had an even higher FT prevalence.

The prevalence of the FT condition increases significantly with age according to 40% of the population after the age of 40years [13]. In this study, the age group most frequently involved and significantly higher was 40-59 years old (40.5%).

This finding was similar to the study reported by Jacob (2019) [3] who reported that the fissured tongue found to be more prevalent in the age group ranging from 41-60 years. Whereas, it was inconsistent with Zahoor *et al* (2018), [22] who reported that FT was most prevalent in the 21- 40 age group, (38 %). However, according to our findings, the prevalence of FT increases with age which was consistent with Nadine and Andreas (2016) [7] and Jahanbani *et al* (2009) [27]. This may be attributed to the hyposalivation contributed factor increased as the ageing progresses.

Regarding the gender of the patients, males are more commonly affected [28]. In this present study, it was observed that FT in females (57.1%) was higher than that in males (42.9%) with no significant differences between males and females  $P = 0.29$ . This finding was in agreement with the study conducted by MUSAAD *et al* (2015) [29] where the FT was more common among females (35.0%) than males (19.5%) and disagreement with Sudarshan *et al* (2015) [20] who reported that out of 387 subjects with fissured tongue, 235 (60.7%) were male subjects and 152 (39.3%) were female subjects.

Based on the number of tongue fissures, the severity of FT was classified into mild, moderate and severe type. (30) The milder types are very common [31].

In our study, the most prevalent type of FT was found to be mild type (26.4%) followed by moderate type (6.4%) and severe type (5.2%). It was in agreement with Jacob *et al* 2019 (7) who reported that 74.1% had mild fissures on the dorsal surface of the tongue, 20.3% had moderate fissures, and 5.6% had severe fissuring of the tongue and also consistent with Picciani *et al* 2017 (30) who conducted a study on 143 patients only with FT (82%) were mild, (16%) were moderate and (2%) were severe. A severe type of FT (49.2%) was high among the 40-59 age group and was found to be statistically significant ( $P = 0.009$ ). this finding coincided with Kullaa [18] who stated that the severity of FT changed with increasing age.

FT is generally an asymptomatic condition but it can present with symptoms if the fissures are deep enough to retain food debris which becomes a reservoir for bacteria and consequently cause inflammation [11]. In the current study, 15 patients with FT (3.3%) symptomatic (had a burning sensation of the tongue) and was found to be statistically significant ( $P < 0.001$ ). This was in agreement with Bhattacharya *et al* (2016) (32) who reported that 4.4% of the subjects were symptomatic and also consistent with Mathol 2015 (33) who reported that only 1% of the patients with FT were symptomatic. In this study, the burning sensation finding was inconsistent with Darwazeh *et al* 2011 who found 23% of the patients with FT had a burning sensation [11] and also inconsistent with Mathew *et al* 2017 [3] who reported that all the patients with FT had no burning sensation symptoms. In our study, the prevalent burning sensation was more common in female (86.7 %) than male (13.3 %) and was found to be statistically significant ( $P = 0.03$ ).

FT is believed to be a congenital anomaly associated with several oral disorders and with geographic tongue [34]. In the present study, the most frequent associated oral lesions with FT was GT 15 cases (1.2%) followed by MRG 4 cases (0.3%) which revealed a high association with FT ( $P < 0.001$ ). This was consistent with Honarmand *et al.* (2012) [35] and Ghose *et al* (1982) [36] who identified a significant association between GT and FT and inconsistent with the study done by Daneshpazhooh *et al* 2004 [37] who reported that GT was seen in 18.2% of patients with FT. However, the association between FT and GT supports a genetic basis for the development of the condition.

A Hungarian epidemiological survey depicted that FT was coexistent with DM followed by hypertension [20]. This fact was confirmed in the present study since DM was recorded in 28 cases (6.1%) and was the most frequent medical condition in subjects with FT, followed by hypertension 16 case (3.5%). This finding was similar to the study conducted by Mathew *et al* 2017 [3] who reported that 20% and 10.8% of FT was found in patients with DM and hypertension respectively, also in

agreement with Byahatti and Ingafou 2010 [26] who reported study on Libyan patients where DM and hypertension were found to be the most common medical conditions associated with FT. On the other hand our study in contrast with Maloth *et al* 2015 [33] and Mehdipour *et al* 2018 [12] who found no association between FT and any specific medical condition and it was statistically insignificant. However, according to our result, there was a highly significant association between FT and medical conditions in Libyan patients ( $P < 0.001$ ).

## Conclusion

Tongue disorders are reflecting many medical conditions of the body. FT is the most common tongue disorder in dental practice. FT among this study sample of Libyan population revealed a higher prevalence. The result of the present study showed that FT was most prevalent in the 40- 59 age group and more common in females. A high significant association was found between the occurrence of FT and GT which may support identifying the exact etiological factor for the condition development. Based on our results, there was a significant association of FT with some medical conditions particularly DM and hypertension that may be helpful in the early diagnosis of some medical conditions. Finally, Patient reassurance and education are necessary to prevent halitosis and focal glossitis then the maintenance of good oral hygiene.

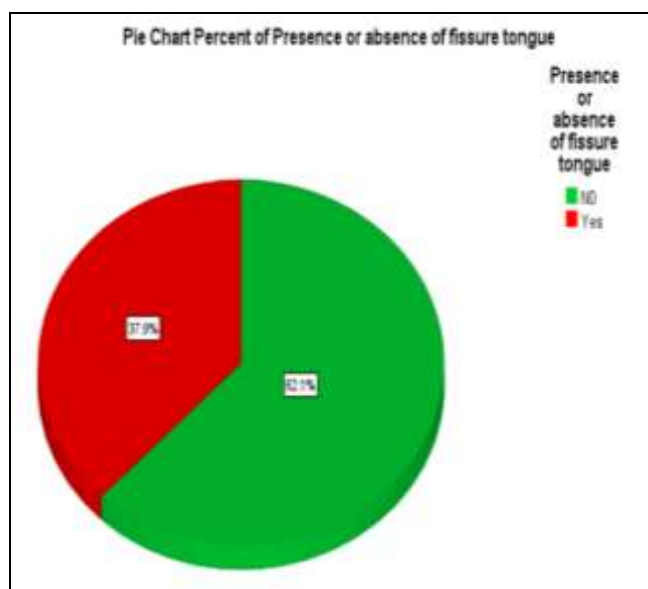


Fig 1: Pie chart representing the prevalence of fissured tongue in the entire study sample.

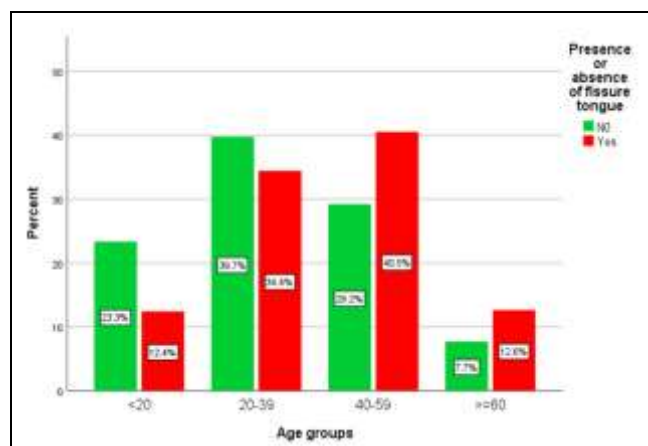
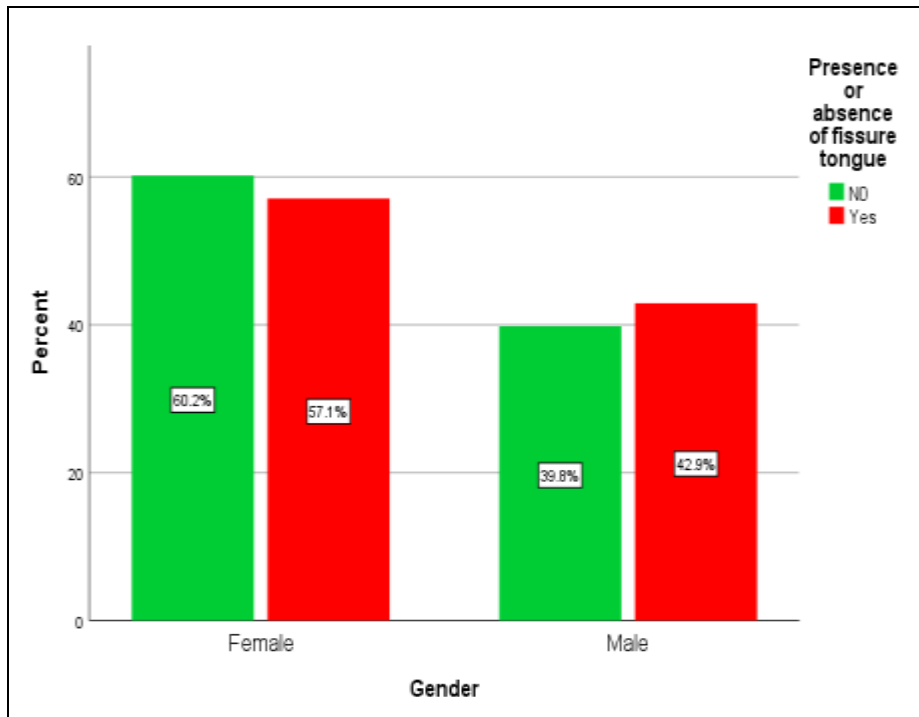


Fig 2: Bar graph demonstrating the percentage distribution of presence or absence of fissured tongue in different age groups.

**Table 1:** Distribution and frequency of fissured tongue in different age groups

Presence or absence of fissured tongue	Number and Percentage	Age groups				Total
		< 20	20-39	40-59	≥ 60	
NO	<i>n</i>	175	298	219	58	750
	(%)	23.3%	39.7%	29.2%	7.7%	
Yes	<i>n</i>	57	158	186	58	459
	(%)	12.4%	34.4%	40.5%	12.6%	
Total	<i>n</i>	232	456	405	116	1209
	(%)	19.2%	37.7%	33.5%	9.6%	



**Fig 3:** Bar graph representing the percentage distribution of fissured tongue in accordance to the gender.

**Table 2:** Distribution and frequency of fissured tongue according to the gender

Gender	Count and Percentage	Presence or absence of fissured tongue		Total
		NO	Yes	
Female	<i>no</i>	452	262	714
	(%)	60.2%	37.1%	
Male	<i>no</i>	299	197	496
	(%)	39.8%	42.9%	
Total	<i>no</i>	751	459	1210
	(%)	100.0%	100.0%	



**Fig 4a:** Mild Fissured tongue.



**Fig 4b:** Moderate fissured tongue.



**Fig 4c:** Severe fissured

**Fig 4a-c:** Intra- oral Photographs showing different types of fissured tongue.

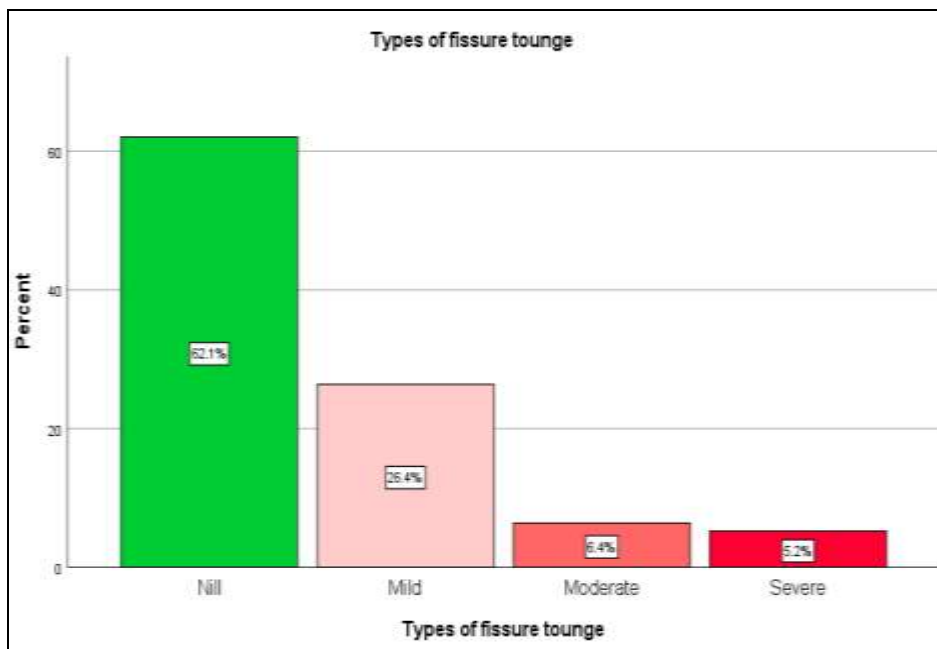


Fig 5: Bar graph showing the distribution of fissured tongue types in the entire study sample.

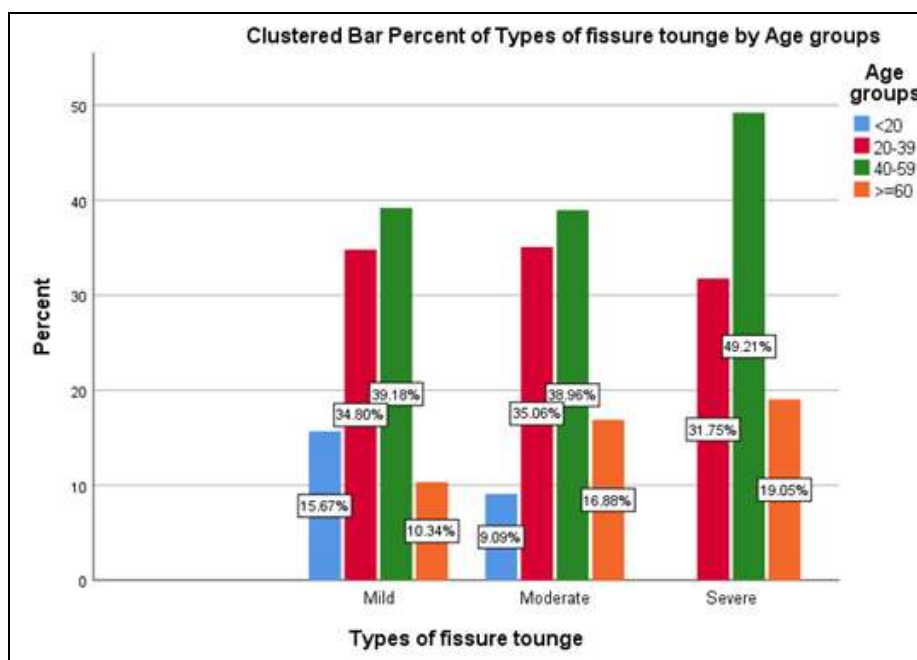


Fig 6: Bar graph representing the percentage distribution of fissured tongue types among different age groups.

Table 3: Distribution and frequency of burning sensation in the entire study sample

Presence or absence of burning sensation	Frequency	Percent	Valid Percent
Nil	751	62.1	62.1
No	444	36.7	36.7
Burning sensation	15	1.2	1.2
Total	1210	100.0	100.0

Table 4: Association of burning sensation with the gender

Presence or absence of Burning sensation	Number and Percentage	Gender		Total
		Female	Male	
No	no	701	494	1195
	(%)	58.7%	41.3%	100.0%
Yes	no	13	2	15
	(%)	86.7%	13.3%	100.0%
Total	no	714	496	1210
	(%)	59.0%	41.0%	100.0%

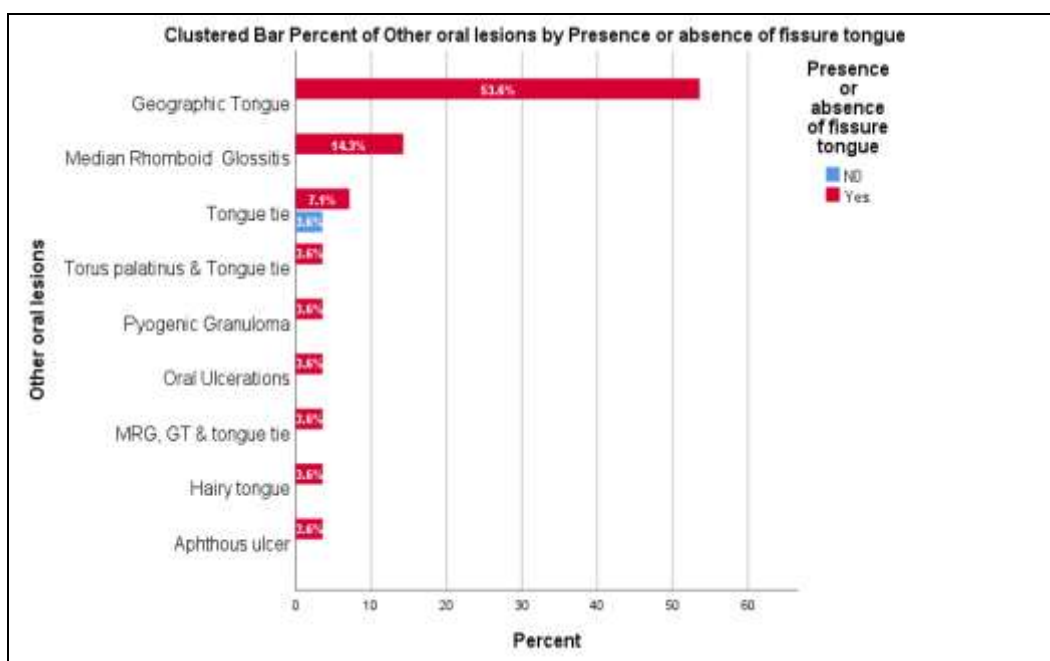


**Fig 7a:** Fissured tongue associated. with geographic tongue.



**Fig 7b:** Fissured tongue associated with median rhomboid glossitis

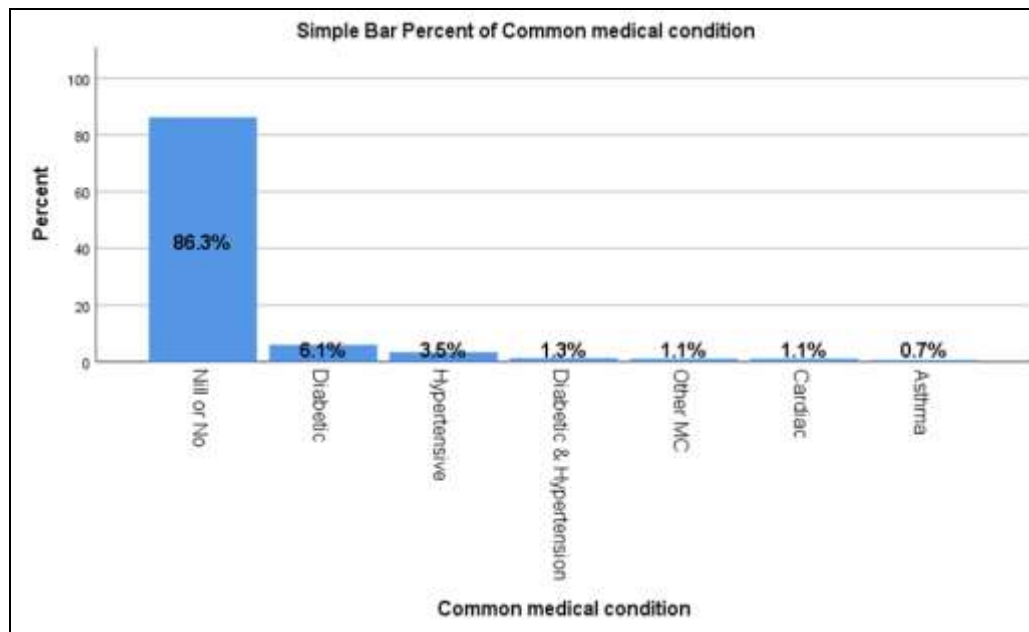
**Fig 7a and b:** Intra-oral photograph showing the most frequent oral lesions associated with fissured tongue.



**Fig 8:** Bar graph representing the most frequent associated oral lesions with fissured tongue.

**Table 5:** Association of medical conditions with presence or absence of fissured tongue

With or without medical conditions	Number and percentage	Presence or absence of fissured tongue		Total
		No	Yes	
Without medical conditions	no	732	396	1128
	(%)	64.9%	35.1%	100.0%
With medical conditions	no	19	63	82
	(%)	23.2%	76.8%	100.0%
Total	no	751	459	1210
	(%)	62.1%	37.9%	100.0%



**Fig 9:** Bar graph demonstrating the most frequent medical conditions associated with fissured tongue subjects.

## References

- Goswami M, Verma A, Verma M. Benign migratory glossitis with fissured tongue. *J Indian Soc Pedod Prev Dent* 2012;30:173-5.
- Kamakshi J *et al.* Fissured Tongue: A Case Report. *J Dental Sci* 2018;3(6):000189.
- Mathew AL *et al.* Prevalence of Fissured Tongue in a South Indian Population: A Cross-Sectional Study. *J Ora Med* 2017;1(9):1- 4.
- Pauly G *et al.* Diffuse Fissured Tongue: The Incidental Icelands: A Case Report. *J Oral Biol* 2018;5(1):2.
- Fomete B *et al.* Pattern and Presentation of Tongue Lesions in Kaduna, Nigeria: A 10 Year Review. *Ann Med Health Sci Res* 2017;7:157-161.
- Basalamah M, Baroudi K. Prevalence of oro-dental anomalies among schoolchildren in Sana'a city, Yemen. *EMHJ* 2016;22(1):34 -39.
- Jacob *et al.* Prevalence of lingua plicata: A cross-sectional study. *J Oral Diag* 2019;04:1- 5.
- Patil S *et al.* Prevalence of tongue lesions in the Indian population. *J Clin Exp Dent* 2013;5(3):128-32.
- Bhat VS. Fissured tongue to worry or not to worry? *Otolaryngology Online J* 2016;6:1-2.
- Nadine DF, Andreas F. Frequency of fissured tongue (lingua plicata) as a function of age. *Swiss dent J sso.* 2016;126(10):886 -891.
- Darwazeh AM, Almelaih A. Tongue lesions in a Jordanian population: Prevalence, symptoms, subject's knowledge and treatment provided *Med Oral Patol Oral Cir Bucal* 2011;16:745-9.
- Mehdipour M *et al.* Prevalence of Geographic and Fissured Tongue abnormalities and factors associated Among Dental Students of Tabriz Faculty of Dentistry. *JIMC* 2018;1(2):69-74.
- Shanmugavadeivel G. *et al.* Fissured tongue in HIV patient under haart: A rare case report. *International Journal of Current Research* 2017;9(1):45736-45738.
- Saritha Maloth *et al.* The Prevalence of Fissured Tongue in 2050 Indian Patients: A Cross-Sectional Study. *IJDRD* 2015;5(4):5-14.
- Sharma S *et al.* Lingua plicata in pustular psoriasis: a rare case report. *Int J Res Dermatol* 2018;4(3):450-452.
- Kelsch RD *et al.* Fissured tongue. *Medscape Reference* 2014.
- Rathee M, Hooda A, Kumar A, Fissured Tongue A. A Case Report and Review of Literature. *The Inter J Nutri and Well* 2009;10(1):1-4.
- Kullaa-Mikkonen A. Familial study of the fissured tongue. *Scand J Dent Res* 1988;96:366-75.
- Crispian Scully, Stephen Porter. *Orofacial Disease: Update for the Dental Clinical Team: 6 Complaints Affecting Particularly the Lips or Tongue.* *Dent Update* 1999;26:254-259.
- Ramachandran Sudarshan *et al.* Newer Classification System for Fissured Tongue: An Epidemiological Approach. *J Trop Med* 2015;5:1-5.
- Jackson SM, Nesbitt LT. *Differential Diagnosis for the Dermatologist Illustrated* ed. Springer Science & Business Media 2008, 1109.
- Zahoor Bhat *et al.* Fissured tongue: A cross-sectional study. *IJADS* 2018;4(3):133-135.
- Deepak Verma *et al.* Malignant Fissure Tongue: An Unusual Presentation. *International Journal of Advances in Case Reports* 2016;3(10):432-434.
- Tyagi *et al.* Various discrepancies during the development of tongue Asian Pac. *J. Health Sci* 2016;3(1):156-160.
- Desai DV, *et al.* Asymptomatic reversible lesion on the tongue: A case series in pediatric patients. *Arch Med Health Sci* 2015;3:113-6.
- Byahatti SM, Ingafou MSH. The Prevalence of Tongue Lesions in Libyan Adult Patients. *J Clin Exp Dent* 2010;2(4):163-8.
- Jahanbani J *et al.* Evaluation of Oral Mucosal Lesions in 598 Referred Iranian Patients. *En Dent J.* 2009;3:42-47.
- Pauly G *et al.* Knowing the grooves: A case of a fissured tongue. *Oral Health Care* 2017;2(2):1-1.
- Musaad AH, Abuaffan AH, Khier E. Prevalence of Fissured and Geographic Tongue Abnormalities among University Students in Khartoum State, Sudan. *Enz Eng J* 2015;5(1):1-5.
- Bruna P, *et al.* Fissured tongue in patients with psoriasis. *J Am Acad Dermatol* 2017;78(2): 413-414.

31. Toosi P, Ghalamkarpourm F. Scrotal tongue as a valuable Clinical feature in psoriasis. MJIRI. 1990;4(2):93-95.
32. Bhattacharya TP *et al.* Prevalence and subjective knowledge of tongue lesions in an Indian population. J Oral Biol and Cran search 2016;6:124 -128.
33. Maloth S *et al.* The prevalence of fissured tongue in 2050 Indian patients: A cross-sectional study. IJDRD 2015;5(5):5-14.
34. Jarvinen J *et al.* Fissured tongue: A sign of tongue oedema? Med Hypotheses 2014;82(6):709-712.
35. Honarmand M *et al.* Geographic Tongue and Associated Risk Factors among Iranian Dental Patients. Iran J Public Health 2012;42(2):215-219.
36. Ghose LJ, Baghdady VS. Prevalence of geographic tongue and plicated tongue in 6090 Iraqi schoolchildren. Community Dent Oral Epidemiol 1982;10:214-216.
37. Maryam Daneshpazhooh. *et al.* Tongue lesions in psoriasis: a controlled study. BMC Dermatology 2004;4(16):1-4.