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Glossodynia And Its Associated Risk Factors In Patients with Geographic And/Or Fissured Tongue at Hawler Medical University: A Retro-Prospective Cross-Sectional Study

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Abstract

Background: Glossodynia is characterized by a painful sensation in the tongue, often accompanied by sleep disturbances, exhaustion, and psychological issues, including anxiety and depression. Glossodynia manifests with a typical oral symptom, such as a burning mouth sensation. Hence, it is important for oral healthcare practitioners to possess knowledge about this clinical condition.

Aim: The objective of this study was to assess the frequency of tongue pain and burning sensation (glossodynia) in patients with geographic and/or fissured tongue. Additionally, the study aimed to identify the influence of age and gender as risk fac- tors in patients with glossodynia. Furthermore, the study investigated the correlation between geographic tongue and fissured tongue with glossodynia.

Patient and method: An investigation using retrospective-prospective cross-sectional design was carried out at the Oral Diagnosis Department of the College of Dentistry/Hawler Medical University. Two hundreds and ninety five patients who sought medical attention at this Department's clinic between September 4, 2022, and May 1, 2024 were included in the research. The patients underwent clinical diagnosis and digital imaging were undertaken to evaluate fissure tongue and geographic tongue.

Results: A total of 295 individuals, with an average age of 36.81 years, were assessed. Among them, 156 (52.9%) were men and 139 (47.1%) were females categorized into age groups: 15-30, 31-45, 46-60, and >60 years in age. Among the 295 patients analyzed in this study, 216 cases (73.2%) had fissured tongue, 68 cases (23.1%) had geographic tongue, and 11 cases (3.7%) had both geographic tongue and fissure tongue as characteristics. Only 17 cases, representing a mere 5.8% of the overall number, have received a diagnosis of glossodynia. Among the 156 male patients, a mere 5 individuals (1.7%) had glossodynia. Within the group of 139 female patients, 12 cases (4.1%) had glossodynia.

CONCLUSION: The study suggest that glossodynia is often seen in female patients and serves as a significant risk factor in the development and worsening of symptoms. Glossodynia continues to be a consequential medical disorder that often requires a substantial interdisciplinary approach in the psychology of the patient and the oral health care system.

Keywords: Burning mouth syndrome, fissured tongue, glossodynia, geographic tongue, orofacial pain.

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INTRODUCTION

Previous research has shown that pain is a contributing element to the development of depression and/or anxiety. An estimated 70% of those suffering from chronic pain is believed to have depression and/or anxiety.[1] Orofacial pain includes various chronic pain conditions such as neuropathic pain, myofascial pain, temporomandibular joint dysfunction syndrome, and glossodynia.[2] Burning mouth syndrome is de- fined as persistent discomfort in the tongue or other oral mucous membranes without any appar- ent abnormalities or organic illness. Patients with burning mouth usually have pain sensations in both sides of the mouth, with the tongue and lip being the most frequently afflicted areas.[3, 4] The condition known as glossodynia is characterized by the presence of tongue discomfort without any abnormalities in the lingual mucosa. Glossodynia is characterized by the following features, it is prevalent among women in a cancer-prone repro- ductive age group (middle-aged and above). Hormone fluctuations during menopause or after menopause, as well as stress, anxiety, and nervousness, contribute to the worsening and persistence of symptoms.[3]

It manifests more often at the tip and lateral borders of the tongue, but occasionally in the posterior region of the tongue.[4] The discomfort alleviates or disappears with speech or eating.[3-6] Glossodynia is often linked to many oral symptoms including subjective xerostomia, dysgeusia, a bitter or metallic taste, subjective sialorrhea, sensory perception of an intraoral foreign body, subjective changes in color or tongue shape, tingling, and itching.[3-5] An evaluation of the tongue is a crucial component of the comprehensive evaluation of the patient's medical state, and a fundamental understanding of the tongue's structure is required.[6] The condition known as geographic tongue or benign migratory glossitis is an inflammatory disease of unknown cause. It is characterized by a reduction in the number of papillae on the dorsum and lateral border of the tongue, resulting in the development of red, round patches with white borders that give the tongue a map-like appearance.[6-9] Geographic tongue is often asymptomatic in clinical settings, but localized discomfort and burning feeling (glossodynia) may develop in the depapillated regions, particularly after consuming highly seasoned hot food or alcohol.[6, 9-12] Smoking may potentially trigger a glossodynia in this particular medical condition.[6] The etiology of geographic tongue remains unclear.[8, 9, 12] Clinically, the fissured tongue is characterized by the existence of anomalous grooves or fissures on the dorsal surface of the tongue.[6, 9] Fissured tongue is one of the most common developmental anomalies of the tongue. In some cases, fissured tongue may occur in association with geographic tongue.[6] An asympto- matic disorder, the fissured tongue commonly presents with inflammation of the fissures caused by a subsequent bacterial infection of accumulat- ed debris, resulting in a painful burning feeling on the tongue.[6, 8, 10] This syndrome often arises with the process of aging and does not need any therapeutic intervention.[6, 8, 9] Similarly to geo- graphic tongue, the cause of fissured tongue re- mains unclear.[8, 9] The researchers have shown a correlation between the geographic tongue and the fissured tongue.[6, 8, 10] Furthermore, clarifying to the patient that geographic tongue and fissured tongue are benign conditions is of utmost importance.[13]

PATIENTS AND METHODS

Research conducted at the Oral Diagnosis Department at the College of Dentistry on patients who visited this department during the academic years 2022-2023 and 2023-2024. Digital images were captured of both an ideal fissure tongue and a geographic tongue to facilitate comparison and identification. Additionally, a thorough history and clinical examination were conducted to identify cases and detect the existence of glossodynia. The medical histories of the individuals were confirmed by reviewing their latest medical records. Detailed demographic information, overall health, and tongue symptoms of the individuals were recorded using a specifically designed case sheet. The patients were positioned in a dental chair and examined using a mouth mirror, a straight probe, and under the illumination of a dental chair light. In accordance with the ethical guidelines established by the Ethical Committee of the College of Dentistry, all patients participating in this study provided informed consent prior to their involvement. The consent process was conducted in a manner that ensured the patient's understanding of the nature and purpose of the study. The consent form was reviewed and signed

by the patient, acknowledging their voluntary participation and comprehension of the information provided.

Sample selection:

This study involved 295 patients, including both males and females, classified into age groups: 15 -30, 31-45, 46-60, and over 60 years, who sought treatment at the Oral Diagnosis Department. The cases included those diagnosed with fissure tongue, geographic tongue, or a combination of both conditions.

Exclusion criteria:

In addition to pregnant women, our research excluded individuals with systemic diseases such as diabetes mellitus, debilitated patients, asthmatic patients, and congenital abnormalities.

Statistical analyses:

Statistical analysis was conducted using SPSS version 28 software, with all data presented as means ± standard error (SE). A comparative analysis of the prevalence of glossodynia among men, females, and different age groups using the Chi-square test and Fisher exact test. This study statistically examined the correlation between tongue disorders and glossodynia.

Figure 1. A case of fissured tongue complaining by glossodynia

Figure 2. A case of geographic tongue complaining by glossodynia

RESULTS

The research included 295 participants diagnosed with fissure tongue and/or geographic tongue. The patient population consisted of 156 males (52.9%) and 139 females (47.1%). The patients were then categorized into four distinct age groups.

120 cases, or 40.7% of the total, were within the age range of 15-30 years, while 89 cases or 30.2%, were in the age range of 31-45 years. Out of the total number of cases, 71 (24.1%) were within the age range of 46-60, while in contrast, just 15 instances (5.1%) were over the age of 60. Among the 295 cases, 216 cases (73.2%) had fissured tongue, 68 cases (23.1%) suffered from geographic tongue, and 11 cases (3.7%) had both geographic tongue and fissure tongue.

In reference to the exposition of patient information shown in Table 1. The occurrence rates of fissure tongue, geographic tongue, fissure and geographic tongue, medical history, medication history, and glossodynia were as reported below: Among the whole patient population, 263 individuals (89.2%) had no medical history, while 32 individuals (10.8%) had a medical background including pre-existing medical conditions. Out of the total patients, 275 (93.2%) were abstaining from drug use, whereas 20 (6.8%) were using pharmaceuticals. A total of 278 cases (94.2%) did not exhibit glossodynia. Seventeen cases, representing a mere 5.8% of the overall number, have received a diagnosis of glossodynia. The mean age of the individuals included in the research was 36.81, accompanied by a standard deviation of 14.48 (Table 2).

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Table 1. Descriptions of patient information

		Count	%
Sex	Male	156	52.9%
	Female	139	47.1%
Age Group	15-30	120	40.7%
	31-45	89	30.2%
	46-60	71	24.1%
	>60	15	5.1%
Medical History	No	263	89.2%
	Yes	32	10.8%
Drug History	No	275	93.2%
	Yes	20	6.8%
Fissure and/or Geographic tongue	Fissure tongue	216	73.2%
	Geographic tongue	68	23.1%
	Fissure tongue & Geographic tongue	11	3.7%
Glossodynia	No	278	94.2%
	Yes	17	5.8%

n=295

Table 2. Mean age of patient

	Mean	SD	Minimum	Maximum	Range
Age	36.81	14.48	15.00	80.00	65.00

The data was analyzed using Chi-square statistical test ($p<0.01$) and Fisher exact test to determine the relationships between glossodynia and other factors including sex, age groups, medical history, drug history, fissure, and geographic tongue (Table 3). The subsequent results were as follows:

Table 3. Association between all variables with Fissure and/or Geographic tongue

Variable	Categorical	Fissure tongue n(%)	Geographic tongue n(%)	Fissure tongue & Geographic tongue n(%)	p*
Sex	**Male**	116 (39.3%)	34 (11.5%)	6 (2.0%)	**0.862**
	Female	100 (33.9%)	34 (11.5%)	5 (1.7%)	
Age Group	**15-30**	73 (24.7%)	41 (13.9%)	6 (2.03%)	**p<0.01** **
	31-45	67 (22.7%)	20 (6.8%)	2 (0.7%)	
	46-60	64 (21.7%)	5 (1.7%)	2 (0.7%)	
	>60	12 (4.1%)	2 (0.7%)	1 (0.3%)	
Medical Histo-ry	**No**	190 (64.4%)	64 (21.7%)	9 (3.1%)	**0.264**
	Yes	26 (8.8%)	4 (1.4%)	2 (0.7%)	
Drug History	**No**	199 (67.5%)	66 (22.4%)	10 (3.4%)	**0.353**
	Yes	17 (5.8%)	2 (0.7%)	1 (0.3%)	
Glossodynia	**No**	204 (69.2%)	63 (21.4%)	11 (3.7%)	**0.605**
	Yes	12 (4.1%)	5 (1.7%)	0 (0%)	

* Used Chi-square test &Fisher Exact Test, n=295
** Significant at Level p<0.01

Of the 156 male patients, only 5 (1.7%) had glossodynia. Out of the 139 female patients, 12 of them (4.1%) had glossodynia (Figure 3).

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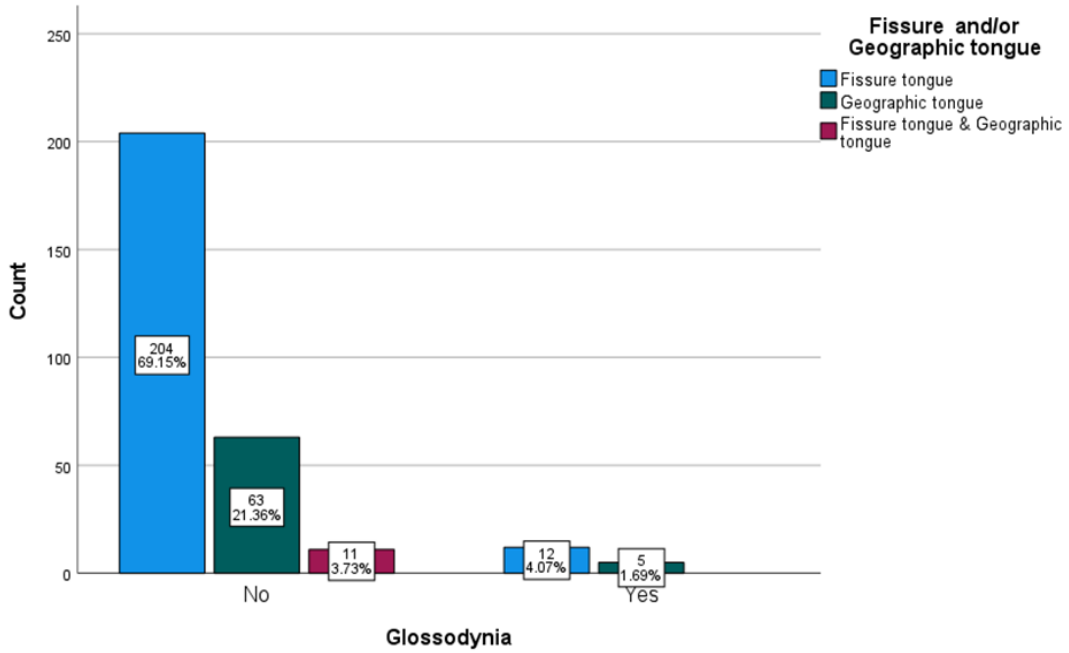

Figure 3. Fissure and/or Geographic tongue with Glossodynia.

Based on sex classifications, 5 male patients and 12 female patients had glossodynia, which is statistically significant

Table 4. Cross tabulation between (Sex and Age Group) in Glossodynia

				No(%)	Yes(%)
Sex	Male	Age Group	15-30	63(21.4%)	3(1.0%)
			31-45	42(14.2%)	1(0.3%)
			46-60	38(12.9%)	1(0.3%)
			>60	8(2.7%)	0(0.0%)
	Female	Age Group	15-30	50(16.9%)	4(1.4%)
			31-45	43(14.6%)	3(1.0%)
			46-60	28(9.5%)	4(1.4%)
			>60	6(2.0%)	1(0.3%)

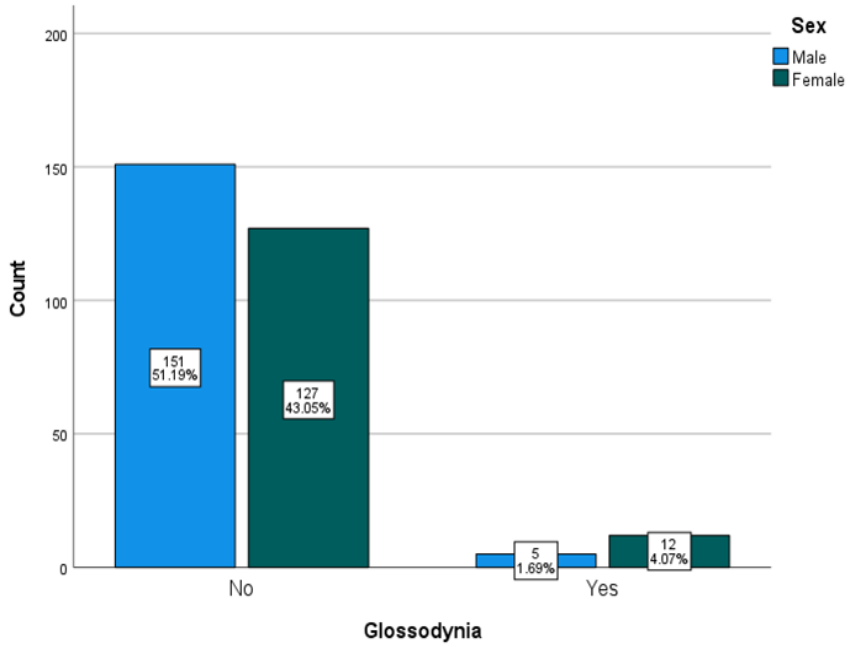

Figure 4. (A) Glossodynia among female and male cases

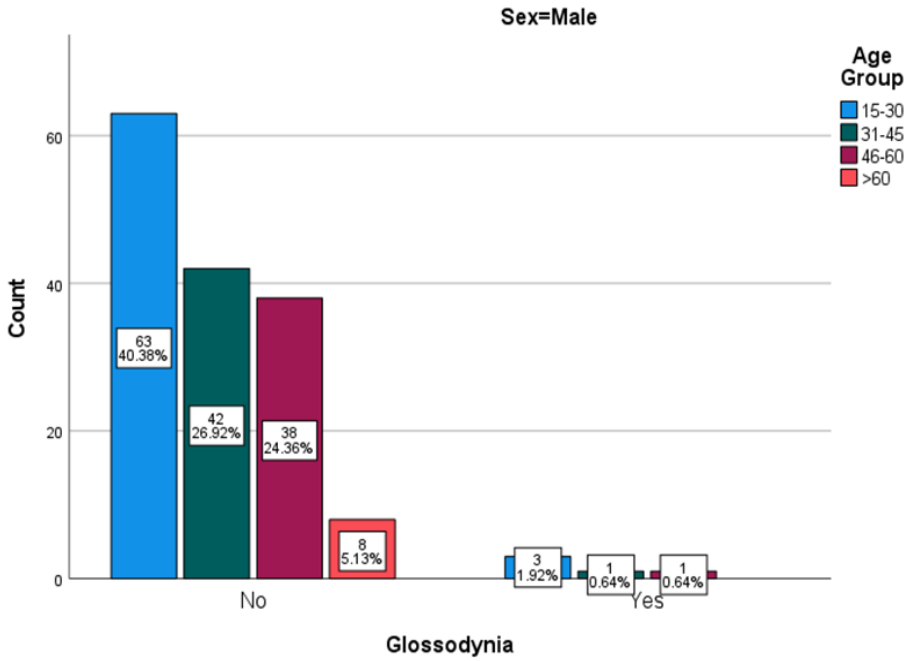

Figure 4. (B) Glossodynia among male cases

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As per age groups, out of those between 15 and 30 years old, 113 individuals (38.3%) did not have glossodynia, while just 7 individuals (2.4%) had glossodynia. Within the age group of 31-45 years, 85 individuals (28.8%) did not have glossodynia, whereas just 4 individuals (1.4%) did.

Inside the 46-60 age group, only 5 cases (1.7%) had glossodynia, whereas 66 cases (22.4%) did not have this condition. Among the 14 cases (4.7%) in the age group over 60 years, none had glossodynia, while just one patient (0.3%) had.

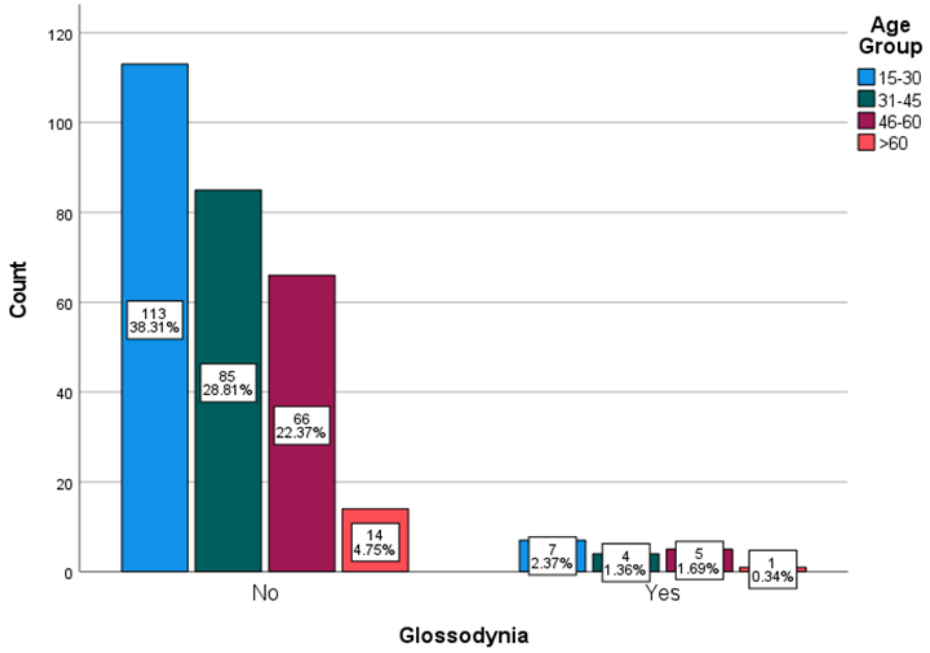

Figure 5. Glossodynia with Age Group

The relationships between sex and age group in glossodynia as the identified risk variables were calculated using the Chi-square statistical test (Table 5).

Table 5. Association between (Sex and Age Group) with Glossodynia

Variable	Categorical	Glossodynia(yes) n(%)	Glossodynia(no) n(%)	p*
Sex	**Male**	5 (1.7%)	151 (51.2%)	**0.046****
	Female	12 (4.0%)	127 (43.1%)	
Age Group	**15-30**	7 (2.4%)	113(38.3%)	**0.919**
	31-45	4 (1.4%)	85(28.8%)	
	46-60	5 (1.7%)	66(22.4%)	
	>60	1 (0.3%)	14(4.7%)	

* Used Chi-square test, n=295

** Significant at Level p<0.05

Statistical analysis using the Chi-square test revealed a significant association between the occurrence of glossodynia and sex ($p<0.05$). However, there was no significant association between glossodynia and age group ($p=0.919$).

DISCUSSION

We classified patients based on their sex and age as having glossodynia. We then used many statistical analysis tests to see whether there are any risk variables related to sex and age in glossodynia among patients with fissured tongue and/or geographic tongue. The results of this research indicated a statistically significant correlation between the occurrence of glossodynia and female genders, which is relatively consistent with the findings of other published studies. The results of our study indicated that there was no statistically significant correlation between the prevalence rate of glossodynia and various age groups. These findings are inconsistent with the previously reported investigations. It should be emphasized that the disparity in these findings is likely attributed to variations in the sample size and the study population assessed in this research.

A glossodynia may present as a primary symptom or as a later outcome of a condition (such as fissured tongue or geographic tongue) that triggers the denudation of the normal tongue surface. The patients often describe a sudden onset of a sharp pain like that of a scalded tongue, which then increases in frequency throughout the day. Typically, the tongue seems normal.[14] Typically, the malfunction resolves on its own after a significant period of time.[5, 14] The cause of glossodynia is uncertain and it mostly affects women at a rate seven times higher than males.[14, 15] The range of anticipated prevalence rates is between 0.7 and 15 percent.[16] The outcomes of this study suggest that the occurrence of glossodynia was (5.8%), which is relatively similar to the results of other investigations.

The current investigation revealed a higher prevalence of glossodynia in females, and this association was statistically significant. Our analysis revealed a disproportionate representation of female patients, with double the number of female patients compared to male patients. This study has identified that (4.1%) of females, in contrast to (1.7%) of men, is affected by glossodynia, which is almost twice the percentage of females affected. These findings are in line with the results of other studies.[17, 18] Investigations conducted by Fillingim and Maixner[18] have identified many potential elements that might account for the disparity in pain levels between females and males. Two often mentioned characteristics include the heightened pain sensitivity of females and the influence of reproductive hormones on pain perception. Females in particular exhibit greater sensitivity to different stimuli such as mechanical, pressure, electrical, or hot/cold stimuli.

Considering the existing literature, which indicates a significant number of women in the glossodynia population who are either peri- or postmenopausal,[20, 21] these findings are equivalent to the results of this study. In contrast, the prevalence rate among female patients aged 31 to over 60 years was (5.76%). Additionally, the reported impact of estrogen on taste suggests that the majority of female patients with glossodynia have experienced taste loss and subsequent burning pain due to hormonal changes.[22, 23] The significant prevalence of glossodynia in postmenapausal patients has sparked research into the influence of estrogen on orofacial pain and if fluctuations in estrogen levels trigger pain.[24]

The secondary analysis in this study indicates that the predicted frequency of glossodynia is greater in fissured tongue compared to geographic tongue. A fissured tongue is a clinical condition that is identical to geographic tongue and is characterized by its lack of pain with an unknown cause.[25]

CONCLUSION

Presently, the collective study findings suggest that glossodynia is often seen in female patients and serves as a significant risk factor in the development and worsening of symptoms. Glossodynia continues to be a consequential medical disorder that often requires a substantial interdisciplinary approach in the psychology of the patient and the oral health care system. Nevertheless, more research is required to determine the long-term outlook based on the sample size and the community being investigated.

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