

Prevalence of tongue lesions among Turkish schoolchildren

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ABSTRACT

Objectives: To collect data on the prevalence of tongue lesions of Turkish schoolchildren in 3 different population samples in Ankara, and to analyze the relationship between tongue lesions and gender, oral hygiene, and income levels.

Methods: Nine hundred and six schoolchildren aged 6-12 participated in this study between March 2004 and July 2004 in Ankara, Turkey. Of the 906 schoolchildren, 442 were girls and 464 were boys from 3 primary schools. We examined all the children for the presence of the following tongue lesions: 1) ankyloglossia, 2) bifid tongue, 3) fissured tongue, 4) geographic tongue, 5) median rhomboid glossitis, 6) lingual thyroid nodule, 7) atrophic tongue, 8) hairy tongue, 9) crenation tongue, 10) furred tongue, 11) macroglossia, 12) microglossia, and 13) lingual or sublingual varicosities.

Results: Of the 906 subjects, we detected 45 subjects

with tongue lesions with a prevalence of 4.95%. We found lesions more frequently in boys (6%) than in girls (4.5%). However, these results were statistically insignificant. Oral lesions commonly found were geographic tongue (1.8%), ankyloglossia (1.3%), fissured tongue (0.9%), bifid tongue (0.4%), hairy tongue (0.2%) and macroglossia (0.2%), lingual thyroid nodule (0.1%). We did not find any of the following lesions: median rhomboid glossitis, atrophic tongue, crenation tongue, furred tongue, microglossia, lingual, or sublingual varicosities.

Conclusion: The tongue has a special importance due to its localization. It can readily affect a patient's social life because of lesions and various symptoms. The localization of tongue may also play important role in diagnosis for systematic, hormonal, and allergic disorders.

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The tongue shows lesions similar to those in other parts of the mouth, and generalized stomatitis can involve the tongue, as in herpetic stomatitis. The tongue is also the site of lesions or the source of symptoms, which are unique to it. For unknown reasons, it can manifest the earliest symptoms of anemia or latent defects of hemopoiesis.¹ Because patients are aware that doctors traditionally look at the tongue to detect any diseases, they themselves look at their own, and sometimes worry about insignificant changes or normal appearance of a tongue they notice, such as the foliate papilla.¹ As there was no available data on the epidemiology of tongue lesions among schoolchildren in Turkey, we considered it useful to construct data on this subject.

The aim of this study was to collect data on the prevalence of tongue lesions of Turkish children in 3 different population samples in Ankara, and to analyze the relationship between tongue lesions and gender, oral hygiene and income levels.

Methods. Turkey is a country that stretches out on 2 continents, Europe and Asia, and is surrounded by sea in 3 directions. Ankara is the capital city of Turkey. Ankara occupies the central Anatolia Region of Turkey and is situated between latitudes 39 degrees and 32 degrees north of the equator. The majority of the ethnic groups in Turkey are Turks (85%). Turkey consists of a highly young

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population. Ankara is one of the most densely populated regions in Turkey and has 3.69 million inhabitants. In Ankara, where this study was performed, education is free and accessible by all children at school age. Thus, a randomly chosen school may have children who are from all social, cultural, and economic groups as well as ethnic groups. This allows a good mixing among children from various qualitative factors. The 3 schools used in this study can be considered as representatives of the social, economic and ethnic groups that can be seen in any area of the country. A total of 906 schoolchildren aged 6-12 years from the Ankara region participated in this study. These included 442 girls and 464 boys from 3 primary schools (**Table 1**). The study was performed during the period March 2004 to July 2004. All the children were examined for the presence of any of the following tongue lesions: 1) ankyloglossia, 2) bifid tongue, 3) fissured tongue, 4) geographic tongue, 5) median rhomboid glossitis, 6) lingual thyroid nodule, 7) atrophic tongue, 8) hairy tongue, 9) crenation tongue, 10) furred tongue, 11) macroglossia, 12) microglossia, and 13) lingual or sublingual varicosities. The criteria for a positive finding in the 13 tongue lesions studied were as follows: 1) ankyloglossia: A thick frenulum on the ventral surface of the tongue that does not allow protrusion of the tip of the tongue beyond the vermilion border of the lower lip.² 2) bifid tongue: Bifurcation at the tip of the tongue.² 3) fissured tongue: Multiple linear fissures of various depths on the dorsal surface of the tongue.² 4) geographic tongue: Patchy areas of papillary atrophy with partly sharp demarcation and partly surrounded by whitish serpiginous lines. In this condition, there is the recurrent appearance and disappearance of red areas on the tongue.^{1,3} 5) median rhomboid glossitis is an abnormality in the midline of the dorsum of the tongue at the junction of the anterior two-thirds with the posterior third.^{4,7} It may be rhomboid, diamond shaped, or irregular.⁸ 6) lingual thyroid nodule: A nodule of variable size located on the dorsal surface of the tongue at the foramen cecum.⁴ 7) atrophic tongue: The view of tongue which bright, smooth surface and has no papillas.⁵ 8) hairy tongue: The filiform papillae can become elongated and air-like, forming a thick fur on the dorsum of tongue.¹ 9) crenation tongue, was diagnosed during the examination of the subject that notices a scolloping or crenation along the lingual periphery of the tongue.⁵ 10) furred tongue: The tongue can become coated with desquamating cells and debris, in those who smoke heavily, in many systemic upsets, especially of the gastrointestinal tract and infections in which the mouth becomes dry and little food is taken. A furred tongue is often seen in childhood fevers, especially scarlet fever.¹ 11) macroglossia: Congenital enlargement of the tongue. 12) microglossia: Abnormal smallness of

the tongue. 13) lingual or sublingual varicosities: Dilated tortuous veins may be seen along the ventral surface of the tongue and tend to become more prominent with age. They may be noticed by patients who need to be reassured that they are not abnormal.¹ The children were examined sitting on an ordinary chair, in natural light, using a pair of mouth mirrors. Oral examinations were performed alternatively by 3 examiners, calibrated previously and continuously by the senior author. The personal data such as gender, age, income levels, and the different tongue lesions to be identified were recorded on specifically designed survey forms. Oral health was assessed as an oral hygiene index (0 = poor, plaque on all teeth; 1 = fair, plaque on half of all teeth; and 2 = good, plaque on less than half of the teeth).⁹ The exclusion criteria was the medical history of a systemic disease that results in a reduction of several functions of tongue and receiving medication that could have side effects on the oral mucosa and tongues. The photographs of the representative cases of the various conditions were taken. Statistical analyses were performed using the computer package of SPSS, version 12. Differences between groups were tested for statistical significance by chi-square test.

Results. Tongue lesions were found in 45 of 906 examined Turkish children; thus, the prevalence rate of tongue lesions was 4.95% in this survey. Lesions seemed to be more common in boys than in girls, but the difference was not significant ($p < 0.10$). **Table 2** shows the relative prevalence of the various conditions between the gender groups. **Table 3** shows the prevalence of the tongue lesions according to the age. The presence of the tongue lesions was found to be varying with the age ($p < 0.001$). The probability of having a tongue pathology is slightly higher in early ages. A much higher prevalence for ankyloglossia, for bifid tongue and for fissured tongue was seen in the boys than in the girls in this study. Ankyloglossia (**Figure 1**) was seen in 1.5% of the boys as opposed to 1.1% of the girls. In the boys, bifid tongue was seen in 0.6% of those examined while only 0.2% of the girls manifested this anomaly. Moreover, fissured tongue (**Figure 2**) was seen in 1.1% of the boys as opposed to 0.7% of the girls. In comparison, geographic tongue (**Figure 3**) was seen more frequently among girls (2%) than boys (1.5%). Lingual thyroid nodule (**Figure 4**) was seen only in a girl. Hairy tongue and macroglossia were seen with approximately equal frequency in both gender in this population. ($p > 0.05$). Among the gender groups, oral hygiene and income levels, some alterations were seen in the prevalence of tongue lesions. However, these results were statistically insignificant ($p > 0.05$). The percentages of boys and girls who have lesions were almost equal in the groups. **Table 4** shows the

Table 1 - Survey of study samples.

Age (years)	Boys	Girls	Total
6	18	11	29
7	128	145	273
8	66	80	146
9	73	66	139
10	117	90	207
11	59	50	109
12	3	-	3
Total	464	442	906

Table 2 - Survey of tongue lesions according to the genders.

Tongue lesions	Number of samples (%)	
	Boys	Girls
Ankyloglossia (n=12)	7 (1.5)	5 (1.1)
Bifid tongue (n=4)	3 (0.6)	1 (0.2)
Fissured tongue (n=8)	5 (1.1)	3 (0.7)
Geographic tongue (n=16)	7 (1.5)	9 (2.0)
Median rhomboid glossitis (n=0)	-	-
Lingual thyroid (n=1)	1 (0.2)	-
Atrophic tongue (n=0)	-	-
Hairy tongue (n=2)	1 (0.2)	1 (0.2)
Crenation tongue (n=0)	-	-
Furred tongue (n=0)	-	-
Macroglossia (n=2)	1 (0.2)	1 (0.2)
Microglossia (n=0)	-	-
Varicosity (n=0)	-	-
Total	25 (0.05)	20 (0.04)

Table 3 - Survey of tongue lesions according to the ages.

Tongue lesions	Age (years)							Total
	6	7	8	9	10	11	12	
Ankyloglossia	-	4	4	3	1	-	-	12
Bifid tongue	-	2	-	-	2	-	-	4
Fissured tongue	2	2	-	-	1	3	-	8
Geographic tongue	1	7	1	1	4	1	1	16
Median rhomboid glossitis	-	-	-	-	-	-	-	0
Lingual thyroid	-	1	-	-	-	-	-	1
Atrophic tongue	-	-	-	-	-	-	-	0
Hairy tongue	-	-	2	-	-	-	-	2
Crenation tongue	-	-	-	-	-	-	-	0
Furred tongue	-	-	-	-	-	-	-	0
Macroglossia	-	1	1	-	-	-	-	2
Microglossia	-	-	-	-	-	-	-	0
Varicosity	-	-	-	-	-	-	-	0

Table 4 - The comparison of tongue lesions according to oral hygiene.

Tongue lesions	Oral hygiene index (%)		
	Good	Fair	Poor
Ankyloglossia (n=12)	3 (0.6)	8 (2.8)	1 (0.9)
Bifid tongue (n=4)	3 (0.6)	1 (0.3)	-
Fissured tongue (n=9)	5 (1.0)	2 (0.7)	1 (0.9)
Geographic tongue (n=16)	11 (2.1)	4 (1.4)	1 (0.9)
Median rhomboid glossitis (n=0)	-	-	-
Lingual thyroid (n=1)	-	1 (0.3)	-
Atrophic tongue (n=0)	-	-	-
Hairy tongue (n=2)	2 (0.4)	-	-
Crenation tongue (n=0)	-	-	-
Furred tongue (n=0)	-	-	-
Macroglossia (n=2)	2 (0.4)	-	-
Microglossia (n=0)	-	-	-
Varicosity (n=0)	-	-	-
Tongue lesions (n=45)	26 (5.0)	16 (5.6)	3 (2.8)
Normal (n=861)	489 (56.6)	269 (31.1)	103 (11.9)
Total (n=906)	515	285	106

Table 5 - The comparison of tongue lesions according to income levels.

Tongue lesions	Income levels (%)		
	Good	Fair	Poor
Ankyloglossia (n=12)	6 (1.4)	5 (1.7)	1 (0.5)
Bifid tongue (n=4)	2 (0.5)	2 (0.7)	-
Fissured tongue (n=8)	2 (0.5)	3 (1.0)	3 (1.6)
Geographic tongue (n=16)	9 (2.1)	6 (2.0)	1 (0.5)
Median rhomboid glossitis (n=0)	-	-	-
Lingual thyroid (n=1)	-	-	1 (0.5)
Atrophic tongue (n=0)	-	-	-
Hairy tongue (n=2)	-	2 (0.7)	-
Crenation tongue (n=0)	-	-	-
Furred tongue (n=0)	-	-	-
Macroglossia (n=2)	1 (0.2)	-	1 (0.5)
Microglossia (n=0)	-	-	-
Varicosity (n=0)	-	-	-
Tongue lesions (n=45)	20 (4.7)	18 (6.1)	7 (3.6)
Normal (n=861)	401 (46.6)	275 (32)	185 (21.4)
Total (n=906)	421	293	192

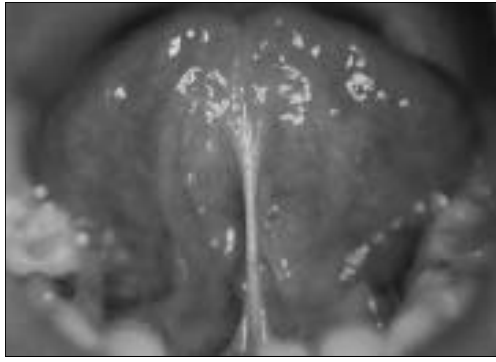


Figure 1 - Ankyloglossia - a thick frenulum does not allow protrusion of the tongue beyond the vermilion border of the lower lip.



Figure 3 - Geographic tongue - patchy areas on the tongue.



Figure 2 - Fissured tongue - deep fissures on the dorsal surface of the tongue.



Figure 4 - Lingual thyroid - note the nodule on the dorsal surface of the tongue at the foramen cecum.

comparison of tongue lesions according to oral hygiene. No correlation between the tongue lesions and oral hygiene conditions could be found statistically ($p>0.05$). Similarly, the relationship between the presence of tongue pathologies and income levels was found to be insignificant ($p>0.10$). **Table 5** shows the relationship between tongue lesions and socioeconomic status. None of the following lesions were seen: median rhomboid glossitis, atrophic tongue, crenation tongue, furred tongue, microglossia, lingual or sublingual varicosities.

DISCUSSION. There are many published studies on the prevalence rates of several tongue lesions in different geographic locations of the world.^{2,3,10-22} In the literature, reports on prevalence of tongue lesions vary greatly, depending on the investigated population, race, age, gender, diagnostic criteria, methodology and sampling procedure of the different investigators. There is only one paper on the epidemiology of tongue lesions in adult Turkish populations,¹⁰ and none in children. So in this study, we collected similar data on a defined child

population in Turkey. We found ankyloglossia in 1.3% of the population investigated, and it was more common in boys than in girls. Prevalence values in this study are much higher than those previously reported.^{3,11,13} In a study performed in Nigeria,³ the prevalence of ankyloglossia was as low as 0.2%, and in a Saudi Arabian study,¹¹ this prevalence was 0.1%. Sedano et al² examined Mexican children and found ankyloglossia prevalence relatively higher than others (0.8%), and a much higher prevalence for ankyloglossia in the boys than in the girls. Ankyloglossia can be complete or partial. In extreme cases of ankyloglossia, nursing and feeding may become a problem shortly after birth, necessitating the surgical removal of the fibrous band. Mild cases of ankyloglossia may go unnoticed for a few years, until the time that speech becomes impaired.²³ Children with ankyloglossia may have difficulties pronouncing certain words. Therefore, their phonetic developmental is interfered with, and this affects personality development. So, we strongly suggest treatment of this congenital developmental condition at an early age. In this study, although the children with ankyloglossia were between 7 and 10

years old, they had not received treatment. This may be the result of either their having very low income families or the ignorance of their parents. Sedano et al's survey² indicates a prevalence of bifid tongue as 5.3% per 1000, with a higher proportion of boys affected, and a prevalence ratio of approximately 2 boys per one affected girl. In this study, we found the prevalence of bifid tongue as 0.4%. In accordance with Sedano et al results, it was found that boys (0.6 %) were high likely to be affected compared with girls (0.4%). There are varied prevalence reports for fissured tongue in the literature, from 0.8-16%, depending on the populations studied.^{2,3,11,13,16,21} Fissured tongue is thought to be of multifactorial etiology.² Although developmental nature seems most likely, we can also consider extrinsic factors such as chronic trauma or vitamin deficiencies as possible causes of fissured tongue.²³ Therefore, we can attribute this difference between the prevalence to different exposure factors of the groups. We found this condition in 0.9% of the studied young population. We can conclude that the vast majority of children with fissured tongue belong to low income families, and the etiology of this tongue lesion may be malnutrition. In the literature, there is no consistency in the distribution of this anomaly between gender. In this study, the occurrence of fissured tongue was more common in males than in females. This result is in accordance with Sawyer et al³ and Kullaa-Mikkonen et al.¹³

Prevalence reports for geographic tongue vary in the literature from 0.2-4%. In this study, we found geographic tongue in 1.8% of the population investigated. This result is in accordance with Sedano et al.² Their values showed a slight, nonsignificant male predilection when compared with females. Salem et al,¹¹ and Sawyer et al³ found geographic tongue with approximately equal frequency in both gender in their population. Kullaa-Mikkonen et al,¹³ on the contrary, found that the percentage of geographic tongue was higher in females than in males. Lingual thyroid is a very rare entity.² It is seen far more frequently in females than in males.⁸ Sedano et al reported only 3 cases among 32,022 examined Mexican children. In this study, we observed lingual thyroid nodule in one girl only, supporting the rarity of the condition. The prevalence of hairy tongue in our study is 0.2%, whereas Kullaa-Mikkonen et al¹³ reports that the most common tongue changes among young Finns was hairy tongue (8.4%). The cause of this marked difference may be both the diagnostic criteria (inclusion of simple coated tongue) and the etiology. Also, we may consider the age distribution as an important factor for this difference. The age range was between 3-35 in the Finnish study with a much higher reported prevalence in aged patients. Avcu and Kanli¹⁰ found the rate of prevalence of

hairy tongue anomalies among an adult Turkish population to be 11.3%. The prevalence of hairy and coated tongue is the most common tongue change in the Turkish population.²⁴ Kullaa-Mikkonen et al¹³ found the prevalence of hairy tongue was nearly equal in both gender.¹³ In accordance with their findings, we found hairy tongue equal in both gender in this study.

Kullaa-Mikkonen et al¹³ reported that prevalence of atrophic changes increases with age, and nutritional factors. We can maybe associate the patients' hormonal balance with the possible atrophic changes in tongue topography. In this study, we found no atrophic tongue in this young population. Beside the atrophic changes, we observed no median rhomboid glossitis, crenation tongue, furred tongue, microglossia, or varicosities in this study. Salem et al¹¹ in a study on 1932 Saudi Arabian schoolchildren also reports the absence of median rhomboid glossitis and microglossia. Although the literature reports that oral hygiene,^{10,13,23} or imbalance of the oral microflora¹³ may be possible etiologic factors in the occurrence of some tongue lesions, we found no correlation between the tongue lesions and oral hygiene conditions in this study. This may be due to the apparently good general health of the children at the time of the survey. According to the results of this study, the most common tongue changes among young Turks were geographic tongue (1.8%). However, there is insufficient available data on the prevalence of developmental tongue lesions for children in Turkey for comparison, and we still require further studies in this field.

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