

Prevalence of Ankyloglossia among Children Reporting with Speech Pathology to District Early Intervention Centre (DEIC)- An Observational Study

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ABSTRACT

BACKGROUND

A sound is produced as a result of various movements and positions of the mobile and immobile elements of the articulation system. Tongue being one of the important mobile elements if restricted may lead to difficulty in articulation of one or more sounds. However, the relationship between speech and ankyloglossia is less investigated. So, we conducted a study to evaluate the prevalence of ankyloglossia among children with speech pathology reporting to District Early Intervention Centre (DEIC).

METHODS

An observational study was conducted in the Department of Dental Surgery in association with DEIC of a tertiary care hospital for a period of one year. Children reporting for evaluation of speech pathology between 3 and 11 years of age were examined. Children with a history of traumatic injury or any surgical / chemo radiation treatment to oral cavity were excluded from the study.

RESULTS

Among the total of 8911 patients who visited DEIC, 380 patients were referred for evaluation of speech difficulty. Among them a total of 304 patients were diagnosed with ankyloglossia. The overall prevalence of ankyloglossia was 3.4 percent and that among patients with speech problem was 80 percent. The prevalence was distributed as 63.5 percent in males and 36.5 percent in females. Type 2 ankyloglossia was highly prevalent (72 percent) than the others.

CONCLUSIONS

A substantial proportion of children with speech problem had ankyloglossia (80 percent). So, all the children with speech difficulty should be screened for ankyloglossia and correction undertaken. Awareness should be created among the common people about ankyloglossia, and the treatment options available.

KEY WORDS

DEIC, Speech Pathology, Ankyloglossia, Prevalence

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BACKGROUND

Clarity of speech is one of the essentials for good psychosocial development of a child through which they display their expressions. Children with speech difficulty often experience psychosocial stigma. A sound is produced as a result of various movements and positions of the mobile and immobile elements of the articulation system. Tongue being one of the important mobile elements if restricted may lead to difficulty in articulation of one or more sounds.¹ Ankyloglossia or tongue tie by definition is the limitation of protrusion and elevation of tongue tip due to shortened lingual frenulum and or genioglossus muscle. It is due to incorrect division of muscles of the floor of the mouth with defective cellular apoptosis during embryogenesis between tongue and floor of mouth resulting in short fibrous lingual frenulum. Such anterior attachment of lingual frenulum greatly influences oral physiological functions like sucking, swallowing, occlusion, speech, oral hygiene measures and other masticatory and social factors.²

Ankyloglossia might hamper the development of acoustic - articulatory stereotypes as the child may limit to produce words by imitation leading to articulation difficulty. The lowered tongue position with limited mobility and altered posture for various sound productions results in a compromised production of consonants and sounds like s, z, t, d, l, j, zh, ch, th, dg and particularly 'r'.³ The varying degrees of ankyloglossia will determine the severity of the problem. However, in mild conditions with minimal symptoms the problem goes undiagnosed and the prevalence is underestimated and also the relationship between speech and ankyloglossia is less investigated. So, the objective of this study is to determine the prevalence of ankyloglossia among children with speech pathology.

METHODS

An observational study was conducted in the Department of Dental Surgery in association with District Early Intervention Centre (DEIC) of our tertiary care hospital. The study population included all children between 3 to 11 years of age who were referred for evaluation for speech difficulty for a period from June 2018 to July 2019. Children with a history of traumatic injury to tongue and any surgical or chemo radiation treatment were excluded from the study. Informed consent was obtained. Their demographic data was recorded and then the children were evaluated by a speech therapist. Then they were subjected to oral examination. The tongue was examined for protrusion and elevation. The diagnosis of ankyloglossia was based on Coryllos classification which describes the following types of lingual frenulum; Type 1: fine elastic frenulum; tongue is anchored from the tip to alveolar ridge and it is heart shaped; Type 2: fine elastic frenulum; tongue is anchored 2 to 4 mm from tip to almost near the alveolar ridge; Type 3: thick fibrous non elastic frenulum; tongue is anchored from middle of tongue to floor of mouth; Type 4: frenulum cannot be seen but palpated; it has a fibrous and / or thick shiny submucous anchoring from base of tongue to floor of mouth. The data was analysed and the prevalence of ankyloglossia was estimated as percentage.

RESULTS

A total of 8911 patients visited the Department of Dental Surgery in DEIC. They were in the age group of 3 to 11 years. Among them 380 patients were referred for evaluation of speech pathology. In the group of children with speech difficulty a total of 304 patients were diagnosed with ankyloglossia. The overall prevalence of ankyloglossia was 3.4 percent and that among patients with speech problem was 80 percent (table 1). The prevalence was distributed as 63.5 percent in males and 36.5 percent in females (table 2). The type 2 ankyloglossia was highly prevalent (72 percent) than the others; type 1 (1.6 percent), type 3 (23 percent), type 4 (3 percent) (table 3).

Sl. No.	Subjects	Total No.
1	No of children referred to DEIC	8911
2	No of children with speech difficulty	380
3	No of children with speech difficulty diagnosed with ankyloglossia	304 (80%)

Table 1. Distribution of Study Population

Sex	Speech Difficulty with Ankyloglossia
Male	193 (63.5%)
Female	111 (36.5%)

Table 2. Sex Distribution of Ankyloglossia

Sl. No.	Types of Lingual Frenulum	Percentage
1	Type 1	5 (1.6 %)
2	Type 2	220 (72 %)
3	Type 3	70 (23 %)
4	Type 4	9 (3 %)

Table 3. Distribution of Types of Ankyloglossia

DISCUSSION

The prevalence of ankyloglossia is less investigated in the available scientific database. In our study the overall prevalence of ankyloglossia was 3.4 percent. In the literature the estimates range from 0.02 to 10.7 percent.⁴ However the wide range of distribution was attributed to variations in definition, diagnostic criteria and also different groups of study population. Our department being a tertiary care referral centre the prevalence recorded was towards the lower range which could be because of referral factors including lack of awareness, non-identification of the condition and lack of referral due to minimal symptoms, target population including only government and aided schools. Also, the visual inspection method to diagnose ankyloglossia in the school referral centers can contribute to under diagnosis, as type 3 and 4 require palpation for diagnosis.

There is still a void in the knowledge on association between speech and ankyloglossia. In our study the prevalence of ankyloglossia in children with speech difficulty was 80 percent. This higher prevalence indicates the importance of oral examination for ankyloglossia in all children with speech difficulty. Though the onset of speech is not affected by ankyloglossia, it does affect the articulation. However, definitive evidence is lacking to address the relationship between speech and ankyloglossia. Few studies support that speech outcomes had improved following surgical correction of ankyloglossia. On the contrary Dollberg et al⁵ and Webb A et al⁶ reported that there is no

improvement in speech outcome following ankyloglossia correction. The study by Daggumati et al⁷ demonstrated that there was satisfactory improvement in speech following frenectomy by comparing with minimal improvement in those who did not undergo surgical correction. Also, many children with ankyloglossia are often found to have no speech problem or they gradually overcome the problem.⁸ In our study higher proportion of ankyloglossia was observed in male children with 63.5 percent and in females it was only 36.5 percent. Jonathan Walsh et al⁹ reported a similar greater male incidence of 63.5 percent. Ballard et al¹⁰ also reported a higher incidence in males with a ratio of 1.5- 2.6:1. The male predominance suggests the possibility of X linked inheritance.

Among the different types of ankyloglossia, type 2 was highly prevalent (72 percent) and type 1 was the least prevalent (1.6 percent) than the other types. Careful digital palpation enabled identification of type 4 frenulum with prevalence of 9 percent as they go under diagnosed with only visual inspection. The study by Ferres Amat et al reported the type 3 frenulum as the most frequent type (59.6 percent) followed by type 2 frenulum (26.9 percent).¹¹ Gonzalez JD et al reported type 2 as the most prevalent frenulum type (54 percent).¹² However study by O'Callahan¹³ reported a higher frequency of type 4 frenulum, thus insisting significance on the factor of relative subjective bias in diagnosis and referral.

CONCLUSIONS

To conclude, a substantial proportion of children with speech problem had ankyloglossia (80 percent) insisting that all children with speech difficulty should be screened for ankyloglossia and correction undertaken. This study thus signified the impact of ankyloglossia on speech. Hence awareness should be created among the common people about ankyloglossia and the treatment options available, so that they can be treated at the earliest.

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