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Research Article

THE PREVALENCE OF ANKYLOGLOSSIA AND ITS EFFECTS ON BREASTFEEDING SUCCESS

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ABSTRACT

Objective: *To* determine the prevalence of ankyloglossia and its impact on breastfeeding rate as well as the usefulness of the Assessment Tool for Lingual Frenulum Function (ATLFF) in assessing the severity of ankyloglossia in breast-feeding newborns.
Methods: We conducted a case-control study among 2,058 infants born in Maternity Hospital of University Medical Center Sarajevo. All infants were examined for ankyloglossia. Two breast-feeding infants with normal tongues were identified and matched for each case. Mothers were interviewed when the babies were 1 and 6 monts old.
Results: The prevalence of ankyloglossia was 3, 9 %. Eighty infants with ankyloglossia and 160 control infants were enrolled. At the age of 1 month the prevalence of exlusive breasfeeding in infants with ankyloglossia was 43% compared to 79 % in the control group without ankyloglossia ($p<0,001$). At the age of 6 monts the breastfeeding rate decreased in both groups, but the difference was still statistically significant (ankyloglossia vs. no ankyloglossia group 29% and 65%, respectivelly ($p<0,001$)). Thirty-two (40%) of the infants with ankyloglossia had ATLFF score of 'perfect', 38 (47,5%) had score 'acceptable', and 10 (12,5%) had score of 'function impaired'. At the age of one month none of the infants with ATLFF score 'function impaired' was breastfeeding, while 50% of those with the score 'perfect' was exlussively breastfeeding.
Conclusions: Ankyloglossia is a relatively common condition in newborns. Infants with ankyloglossia were significantly more likely to be exclusively bottle-fed by 1 and 6 months of age. The ATLFF was a useful tool to identify which infants with ankyloglossia are at risk for breast-feeding problems.

INTRODUCTION

Ankyloglossia is a congenital oral anomaly caused by an unusually short lingual frenulum. In breastfeeding infants it can cause ineffective latch, inadequate milk transfer and maternal nipple pain resulting in early weaning. Because the lingual frenulum tethers the tongue to the floor of the mouth thus prohibiting its extension beyond the lower gum, infants with ankyloglossia are unable to form an appropriate seal when breastfeeding (1,2). The only available tool designed to assess the severity of the problem is the Assessment Tool for Lingual Frenulum Function (ATLFF). The purpose of this study was to determine the prevalence of ankyloglossia in our population and by using a case-control design to determine whether breast-fed infants with ankyloglossia have lower rates of breast-feeding at 1 and 6 months of age compared to infants without ankyloglossia (3,4). Our objective was also to test the usefulness of the ATLFF in assessing the severity of ankyloglossia.

METHODS

The study took place at Maternity Hospital of University Medical Center Sarajevo **f**rom August 1, 2017 to January 15, 2018. All newborns included in the study were admitted to the normal newborn nursery. The infants'oral cavity was examined and documented whether they had ankyloglossia. If the baby had the appearance of ankyloglossia we used the Assessment Tool for Lingual Frenulum Function (ATLFF) to assess its severity (Table 1.).

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Table 1 Assessment Tool for Lingual Frenulum Function

Appearance Items	Function Items
Appearance of tongue when lifted 2: Round or square 1: Slight cleft in tip apparent 0: Heart- or V-shaped Elasticity of frenulum 2: Very elastic 1: Moderately elastic 0: Little or no elasticity Length of lingual frenulum when tongue lifted 2: > 1 cm 1: 1 cm 0: <1 cm Attachment of lingual frenulum to tongue 2: Posterior to tip 1: At tip 0: Notched tip Attachment of lingual frenulum to inferior alveolar ridge 2: Attached to floor of mouth or well below ridge 1: Attached just below ridge 0: Attached at ridge	Lateralization 2: Complete 1: Body of tongue but not tongue tip 0: None Lift of tongue 2: Tip to mid-mouth 1: Only edges to mid-mouth 0: Tip stays at lower alveolar ridge or rises to mid-mouth only with jaw closure Extension of tongue 2: Tip over lower lip 1: Tip over lower gum only 0: Neither of the above, or anterior or midtongue humps Spread of anterior tongue 2: Complete 1: Moderate or partial 0: Little or none Cupping 2: Entire edge, firm cup 1 : Side edges only, moderate cup 0: Poor or no cup Peristalsis 2: Complete, anterior to posterior 1: Partial, originating posterior to tip 0: None or reverse motion Snapback 2: None 1: Periodic 0: Frequent or with each suck **SCORE:** Appearance:_____(<8= ankyloglossia) Appearance:_____(<11=ankyloglossia)
-Significant ankyloglossia is diagnosed when the appearance score total is 8 or less and/or function score total was 11 or less. -Severe maternal nipple pain during breastfeeding, without alternate explanation as assessed by a Lactation Consultant, is also grounds to consider frenotomy if a tight anterior frenulum is noted. Ankyloglossia Grading: Class I: mild ankyloglossia, 12-16 mm Class II: moderate ankyloglossia, 8-11mm Class III: severe ankyloglossia, 3-7 mm Class IV: complete ankyloglossia, less than 3 mm	

ATLFF consists of 5 items assessing newborn tongue appearance and 7 items assessing tongue function. Significant ankyloglossia is diagnosed when the appearance score total is 8 or less and/or function score total was 11 or less. Two breast-fed infants without ankyloglossia were identified and matched for each case, and these infants were used as control subjects. The Mantel-Haenszel χ^2 statistic for matched data was used to test for differences in breast-feeding status between groups.

RESULTS

During the study period, 2058 infants were born in Maternity Hospital of University Medical Center Sarajevo. Out of these, 80 were identified as having ankyloglossia by the nursery nurses and confirmed by the study investigators, for a prevalence of 3,9 %. 56 of the affected newborns were male and 24 were female (male-female ratio, 2.3:1.0).

Table 2 Characteristics of the mothers enrolled in the study

	Case subjects	Control subjects	P value
Age(standard deviation)	26,7 (5,9)	27,2 (4,9)	0,185
Decided to breastfeed			
before pregnancy	47 (58,7%)	112 (70%)	
in pregnancy	20 (25%)	40 (25%)	
after delivery	13 (16,25%)	8 (5%)	
Number of previous babies breastfed			
none	41 (51,25%)	77 (48,13%)	
≥1	39 (48,75%)	83 (51,88%)	

At the age of 1 month the prevalence of exlusive breasfeeding in infants with ankyloglossia was 43% compared to 79 % in the control group without ankyloglossia (p<0,001). At the age of 6 monts the breastfeeding rate decreased in both groups, but the difference was still statistically significant (ankyloglossia vs. no ankyloglossia group 29% and 65%, respectivelly (p<0,001)). Thirty-two of the infants with ankyloglossia had ATLFF scores of "perfect," 38 had scores of "acceptable," and 10 had scores of "Function Impaired“. At the age of one month

none of the infants with ATLFF score 'function impaired' was breastfeeding, while 50% of those with the score 'perfect' was exlussively breastfeeding (Table 3.) which showes that ATLFF is successful tool for predicting breastfeeding outcome in infants .

Table 3 Outcomes at 1 month of age based on Assessment Tool for Lingual Frenulum Function (ATLFF) Score

	Function Impaired (n = 10)	**Perfect (n = 32)**
Bottle-feeding only	4 (40%)	4 (12,5%)
Breast-feeding and bottle-feeding	2 (20%)	12 (37,5%)
Breast-feeding only	0	16 (50%)
Frenotomy followed by breast-feeding only	4 (40%)	0

DISCUSSION

Our finding of 3,9 % prevalence is lower but consistent with recent reports of the prevalence of ankyloglossia (4.4%7 and 4.8%.) (5,6,7). Infants with ankyloglossia in this study were 2 times more likely to be exclusively bottle-fed at 1 month than control subjects with normal tongues. Moreover, at 6 months of age, breast-feeding rates both for tongue-tie and control infants decreased, but the difference between the groups was still significant. Therefore, ankyloglossia appears to affect the breast-feeding ability. It is the function, not the appearance, of the tongue that is crucial for successful breast-feeding (8). The results shown in Table 3. suggest that the infants with 'Perfect' scores have better outcomes at 1 month than those with 'Function Impaired' scores. However, more infants need to be studied to answer that question definitively.

CONCLUSION

Ankyloglossia is a relatively common condition in newborns. Our study showed that infants with ankyloglossia were significantly more likely to be exclusively bottle-fed by 1 and 6 months of age. Also we showed the ATLFF to be a useful tool for determination which infants with ankyloglossia would have difficulty with breast-feeding. The development and testing of such a tool remains a research priority. The role of frenotomy in the management of infants with ankyloglossia that have breast-feeding problems needs further evaluation.

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