JCTEI
JOURNAL OF CLINICAL TRIALS AND EXPERIMENTAL INVESTIGATIONS
Year: 2023 Volume: 2 Issue: 1

ORIGINAL ARTICLE

10.5281/zenodo.7568801

Efficacy of tongue-tie excision in the treatment of childhood ankyloglossia: 8 years of experience in a single-center

Mehmet Uysal[1] - Serkan Arslan[2]

1. Department of Pediatric Surgery, Medical Faculty of Karamanoğlu Mehmetbey University, Karaman, Turkey
2. Department of Pediatric Surgery, Medical Faculty of Dicle University, Diyarbakir, AZ 21000, Turkey

Correspondence
Mehmet Uysal, MD
Department of Pediatric Surgery, Medical Faculty of Karamanoğlu Mehmetbey University, Karaman, Turkey. Phone: +905376912451

e-mail
drmyzuysal3@gmail.com

Received: 12 December 2022
Revised: 29 December 2022
Accepted: 31 December 2022
Published: 25 January 2023

Keywords
- Ankyloglossia
- Breastfeeding
- Childhood
- Frenotomy

ORCID ID of the author(s):
MU: 0000-0003-1561-6601
SA: 0000-0002-3456-9217

Abstract

Objective: This study aims to present the results of the frenotomy technique in conditions of ankyloglossia (tongue-tie) identified and cu ed in the fi st ten years of life.

Materials and methods: In this study, ankyloglossia cases operated on between April 2014 and March 2022 in the Karaman Training and Research Hospital Pediatric Surgery Clinic were retrospectively reviewed. The number of patients included in the study age group was as follows; 0-90 days 180 (63.3%), 90-360 days, 76 (26.8%), 360 days-10 years 28 (9.9%).

Results: Frenotomy was carried out on 284 patients, 228 (80.3%) boys and 56 girls (19.7%) with tongue-tie between the ages of one day-10 years. The number of them included in the study age groups was as follows; 0-90 days, 180 (63.3%), 90-360 days, 76 (26.8%), 360 days-10 years 28 (9.9%). The patients were classified as 173 patients with type 1, 94 patients with type 2, 6 patients with type 3, and 11 patients with type 4 according to the Coryllos classification defined according to the examination findings. During frenotomy, no anesthesia was performed on the patients in Group 1, general anesthesia was administered to 10 of 48 patients in Group 2, and 11 of 14 patients in Group 3. At follow-up, all patients showed significant improvement in sucking and the baby's nipple grip. Considering all patients, 54 (75%)of 72 mothers with nipple pain improved.

Conclusions: Frenotomy is a surgical procedure that may require general anesthesia and has few complications, especially in babies older than 3 months.

Cite as: Uysal M, Arslan S. Efficacy of tongue-tie excision in the treatment of childhood ankyloglossia: 8 years of experience in a single-center. J Clin Trials Exp Investig. 2023;2(1):23-9.

Introduction

Ankyloglossia is comparatively common, especially in newborn babies. It is an innate anomaly that limits the forward and lateral movements of the tongue. It is an ailment defined in antiquity. Speech problems related to tongue-tie were described in the 3rd century BC (BC) while sucking problems were described 500 years ago (1).

The incidence of ankyloglossia is diffe ent in various studies in the literature. It diffe s between 4% and 10.7% according to the results of five methodological studies. In a study conducted during school childhood, it was reported as 16% (2,3). This rate is considered to be due to the diffe ent age groups of children in studies. Children with ankyloglossia may have difficult in sucking, but not all of them have breastfeeding problems, and 40-75% of babies with tongue-tie can be successfully fed with breast milk (3). Ankyloglossia can cause various complaints in infants such as inability to stick out the tongue, heart-shaped tongue, incapacity of getting the nipple completely while sucking breast milk, feeding difficulties cracked nipples of the mother, pain in the nipple, and speech disorders (4-5).

The standard treatment of short tongue tie has not been defined in the literature, and the necessity of its treatment, the surgical technique to be applied, the timing of the surgical procedure to be applied, and its clinical significance have been continuing to be uncertain recently (6). Frenotomy and frenuloplasty are the two main treatment methods used in the treatment of tongue-tie in babies. Frenotomy is the process of separating the frenulum from the midline or lower border of the tongue. This procedure can be performed without anesthesia in newborns or with general anesthesia in older children. It is a surgical procedure with no reports of excessive bleeding or complications (7).

With this research, we wanted to share the methods and results we used in patients identified and cured with frenotomy in the fi st ten years of life.

Materials and methods: After obtaining approval from the Ethics Committee with the date 24/05/2022 and the decision number 2022/5-11, patients who underwent surgical intervention for tongue short frenulum between April 2014 and March 2022 were included in the study. The files of infants aged 0-10 years were reviewed retrospectively in terms of presentation complaints, short frenulum type, the technique applied, and results.

The number of patients included in the study age group was as follows; 0-90 days 180 (63.3%), 90-360 days, 76 (26.8%), 360 days-10 years 28 (9.9%). Patients were classified according to their complaints as difficult in sucking, inability to protrude their tongue, feeding with a bottle, pain at the mother's nipple, and incapable to get the breast, and they were divided into groups (**Table 1**). Frenotomy was performed with the help of blunt scissors with a fine tip after the tongue was lifted upwards (**Figures 1-2-3**).

All patients were treated in operating room conditions. Frenotomy was performed without any local or general anesthesia in patients before 90 days of age, and general anesthesia was applied to some of the patients older than 90 days. Since there is a change in brain development in a newborn baby between the fi st 6 months and the fi st 6 months, surgical intervention was considered without any anesthesia method in order to avoid any psychological side effects. Local or general anesthesia was preferred, considering that there may be aspiration due to bleeding, especially after the excision of the tongue tie for more than 3 months.

In patients who were not anesthetized for the frenotomy procedure, the baby was fixed in the swaddling position and supported by the assistant by raising the head and neck, then the tongue was raised by the surgeon, and the tongue tie was put forward. The tongue tie in diffe ent shapes and thicknesses

Table 1: The complaints of the patients according to the groups

Complaints	Group 1 (n=180)		Group 2 (n=76)		Group 3 (n=28)		Toplam		P-value
	N	%	N	%	N	%	N	%	
Difficulty in sucking	180	100	76	100	28	100	284	100	**<0.05**
Inability to stick out one's tongue	180	100	76	100	28	100	284	100	**<0.05**
Inability to grasp the breast	144	80	36	47	8	29	188	66	**<0.001**
Bottle feeding requirement	56	31	15	20	5	18	76	27	>0.05
Pain in the mother's nipple	51	28	9	12	3	11	63	22	>0.05

Table 2: Patient distribution

Corryllos classification	N	%
Type 1	173	61
Type 2	94	33
Type 3	6	2.1
Type 4	11	3.9

was cut with the help of blunt scissors with a fine tip. After the procedure, a tampon was applied under the tongue for 30 seconds to stop the bleeding. In other patients, the procedure was performed under general anesthesia. Bipolar cautery was used in patients with bleeding after tongue-tie excision.

In patients who underwent tongue tie excision; Oral intake was started after 10 minutes in those who did not receive general anesthesia and after 2 hours in those who did. No additional exercise was recommended to the patients. Choline salicylate was used as an analgesic in all patients before and after the frenotomy. Choline salicylate was used in all patients for at least 7 days after surgical intervention.

Statistical analysis

All items underwent statistical analysis of quantitative and qualitative data, including frequency and descriptive statistics. Mean±SD is the expression for continuous data. To ascertain whether the data had a normal distribution, the Shapiro-Wilk test was applied to the continuous variables. The Student's T-test was used to compare variables that were continuous and normally distributed. In cases where the data did not fit the normal distribution, non-parametric tests were chosen. The chi-square test or Fisher exact test was used, as appropriate, to evaluate the categorical variables. Version 24.0 of SPSS Statistics for Windows was used for the analyses (IBM Corp., Armonk, NY, USA). P values were all two-sided, and p values below 0.05 were regarded as statistically significant

Figure 1: Ankyloglossia examination finding

Results: Between April 2014 and March 2022, frenotomy was carried out on 284 patients, 228 (80.3%) boys and 56 girls (19.7%) with tongue-tie between the ages of one day-10 year. The male-to-female ratio is 4:1. Simultaneous circumcision procedure was also performed in 124 (54.3%) of 228 male patients. Circumcision was previously performed on 47 other male patients. Fifty-seven patients' parents did not want to have the circumcision procedure done in this session.

Aged one day-10 year (mean age: 254 days) underwent a frenotomy included in this sampling retrospective study. In addition, they were classified as 173 patients with type 1, 94 patients with type 2, 6 patients with type 3, and 11 patients with type 4 according to the Coryllos classification (8,9) defined according to the examination findings (**Table 2**). During frenotomy, no anesthesia was performed on the patients in Group

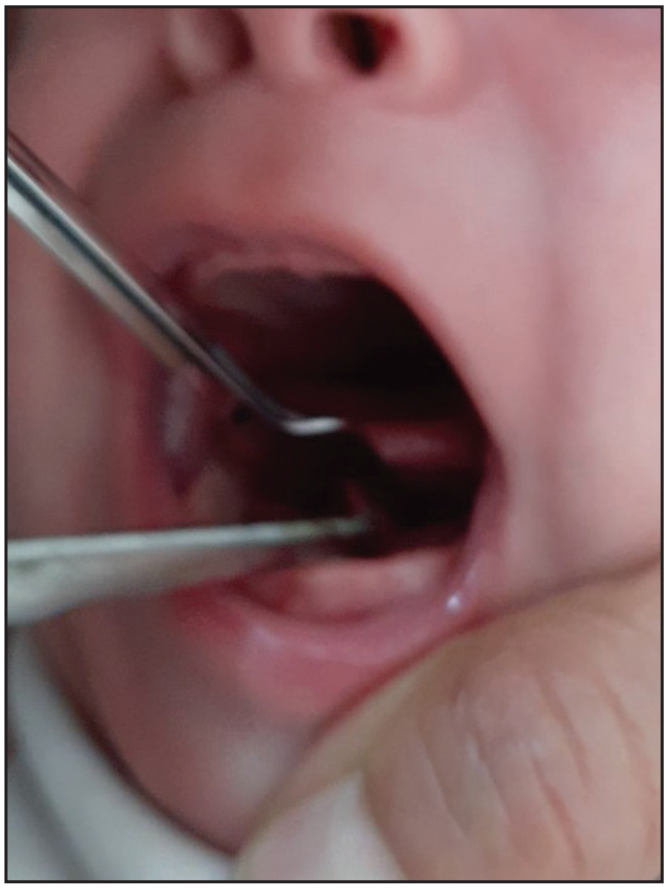

Figure 2: Elevation of the tongue and frenotomy procedure

Table 3: Evaluation of

	Group 1		Group 2		Group 3		P-value
	N	%	N	%	N	%	
Frenotomy success	86	96	45	94	14	100	**>0.05**
Application under general anesthesia	0	0	10	21	11	79	**<0.001**
Bipolar cautery requirement	90	100	12	25	12	86	**>0.005**

1, general anesthesia was administered to 10 of 48 patients in Group 2, and 11 of 14 patients in Group 3.

After the frenotomy procedure (**Figure 3**), the buffer was applied to the surgical area for 30 seconds in both groups. No additional implementation was necessitated for bleeding in any of the 180 patients in Group 1, and bleeding control was performed with bipolar cautery in n:12 (25%) patients of 48 patients in Group 2 with suspected bleeding (**Table 3**). We needed bipolar cauterization for bleeding control after frenotomy in 25 percent of patients in group 2 and in 86 percent of patients in group 3. There was no need for bleeding control with sutures in any patient. No complications were observed in any of the patients in the early postoperative period, and the patients were discharged after oral feeding and bleeding control.

In the postoperative period, the patients were called for control examination on the 7th and 30th day. At follow-up, all patients showed significant improvement in sucking and the baby's nipple grip. Considering all patients, 54 (75%) of 72 mothers with nipple pain improved. Partial improvement was observed in 9 of the patients with the complaint of inability to stick their tongue out, and these patients were considered relapse cases. It was determined that these two patients were in Group 1, who underwent frenotomy without any anesthesia and had type 4 tongue-tie according to the Coryllos classification. No change was detected in the status of bottle feeding.

No patient experienced infection, bleeding, or problem in the mouth of the sublingual Wharton duct.

Discussion

The sublingual frenulum is a structure developed in the form of a mucosal fold that normally covers the floor of the mouth to the lower middle part of the tongue and serves to stabilize the tongue, and does not interfere with tongue tip movement under normal conditions (9-10). Tongue tie (ankyloglossia), on the other hand, is a thick and short adhesion of the sublingual frenulum towards the tip of the tongue. This adhesion causes the tongue tip to stick to the floor of the mouth and loss of movement and function in the tongue. Its incidence in newborn babies varies between 4-11% (11-12).

A tongue tie causes pain in the mother's nipple due to the baby's inability to hold and grasp the mother's breast adequately and may cause difficult in sucking and difficult sucking the baby (13). In our study, all patients had complaints of difficult sucking. In a randomized controlled study of 30 patients aged one to 35 days, Buryk et al. (14) and Dollberg et al. (15) in another randomized prospective study on 25 newborns reported that frenotomy improved feeding very rapidly and reduced nipple pain in the mother. In these two studies, complications were not signifie in any of the neonates who underwent frenotomy. Considering all the patients in our study, improvement was observed in 54 (75%) of 72 mothers with nipple pain. Partial improvement was observed in 9 of the patients with the complaint of inability to stick their tongue out, and these patients were considered relapse cases. No change was detected in the bottle-feeding status.

In our study, like these two studies, the mean age was relatively low, and a significant improvement was observed in sucking-related complaints. Although UK-based guidelines define frenotomy as a surgical method that can be performed without anesthesia in

Figure 3: Appearance after tongue-tie excision

infants with breastfeeding problems, they recommend a comprehensive evaluation of the necessity of the procedure.However, Canadian guidelines defined later do not routinely recommend frenotomy as tongue tie may not cause breastfeeding problems. The patients in our study were also operated without anesthesia, in accordance with the general recommendation in the literature, and some of them because families did not want general anesthesia (16).

In countries and regions with better socioeconomic status, it has been revealed that the frenotomy procedure, together with the recommendations for breastfeeding, has been performed four to forty times more in the last ten years. These findings increase the debate about whether babies with tongue ties are overtreated. In older children, tongue-tie may lead to speech problems, poor oral hygiene, abnormal tooth structure, and inability to play wind instruments (17).

The tongue moves to the milk sinuses in a peristaltic way during sucking, allowing milk to come out. The tongue tie prevents this peristaltic movement, causing the nipple to be compressed between the gums and a problem in the mother's nipple. In recent years, with the encouragement of breastfeeding and breastfeeding, the rationale for frenotomy has emerged as the improvement of breastfeeding rather than speech problems (18). In the current study, it is seen that the complaints of difficult in sucking and inability to grasp the nipple of the baby decreased significantly in babies who underwent frenotomy. This is especially important for mother-infant bonding. In the same way, it is observed that there is an improvement in the mother's complaint of nipple pain.

The most important issue is whether or not patients with tongue-tie should be treated or not. Some studies support those symptomatic patients should be treated. Apart from this, there are also studies stating that it is not necessary to be treated (19). Since all patients in the current study were symptomatic cases, surgery was indicated.

Frenotomy is a surgical method that can be implemented very quickly, safely, and as a day-to-day procedure, in which the sublingual ligament is cut only without anesthesia. In frenuloplasty, in addition to cutting the sublingual ligament, some division is made in the genioglossus muscle, and repair is also performed with horizontal or vertical suture techniques. Recurrence was reported at a rate of 3.7% in 322 patients between 0-6 months, and in another study between 0-2 years of age, and 2.3% in 382 patients who underwent frenotomy, and it should be kept in mind that recurrence may occur due to scar formation in the postoperative period (20). In our study, recurrence was observed in 11 patients (3.9%). In addition, it should be kept in mind that bleeding or infection may develop after the procedure, although it is rare. However, nerve damage may occur due to the movement of the baby during the procedure or the massage applied afterward, serious respiratory problems have been reported as a result of the imbalance of the tongue, but it is seen that the patients with respiratory problems are syndromic babies. For bleeding control in this study, 12 (25%) of 48 patients in Group 2 and 12 (86%) of 14 patients needed to control bleeding with bipolar cautery. None of the 180 patients in Group 1 required cauterization, except compression with a tampon. In addition, bleeding or infection was not observed in the cases after the procedure. There are also monopolar cautery tongue-tie interventions or laser methods in the literature.

In eleven patients who had partial improvement in the follow-up, the patient's tongue tie was type 4 according Coryllos classification (**Table 4**), that is, the patients whose tongue tie thickness was thought to continue towards the tongue root did not require additional intervention and they are being followed. In such patients, the above-described frenuloplasty methods, which are a more complicated procedure, should also be considered. Questions such as which tongue ties will efficacy from frenotomy, what is the ideal timing, what is the best technique, and what are the long-term results, cannot be answered clearly (21).

Conclusions

Frenotomy is a surgical procedure that may require

Table 4: Classification of Coryllos

Classification of Coryllos	
Type 1	The frenilum is attached to the tip of the tongue, usually extending into the alveolar arch.
Type 2	The frenilum attaches 2-4 mm behind the tip of the tongue and attaches to the alveolar arch.
Type 3	The frenilum extends from the middle part of the tongue to the floor of the mouth.
Type 4	Adhesion is in the form of a thick, shiny, inelastic structure at the root of the tongue.

general anesthesia and has few complications, especially in babies older than 3 months. An additional implementation may be necessitated for bleeding control in babies older than 3 months who underwent frenotomy. Depending on the type, surgical method and thickness of the frenulum, it should be considered that there may be a possibility of recurrence and frenotomy may not be sufficient If an association between notable ankyloglossia and major breastfeeding problems is identified and a surgical procedure is considered essential, frenotomy should be conducted by a clinician practiced with the execution, using suitable analgesia.

Conflict of interest: The authors report no conflict of interest.
Funding source: No funding was required.
Ethical approval: Ethical approval was obtained from the Karamanoğlu Mehmetbey University School of Medicine Ethics Committee with the date 24/05/2022 and the decision number 2022/5-11.
Peer-review: Externally. Evaluated by independent reviewers working in at least two different institutions appointed by the field editor.
Data availability: The datasets generated during and/or analyzed during the current study are available from the corresponding author on reasonable request.

Contributions

Research concept and design: MU, SA
Data analysis and interpretation: MU
Collection and/or assembly of data: MU, SA
Writing the article: MU
Critical revision of the article: MU, SA
Final approval of the article: MU, SA
All authors read and approved the final version of the manuscript.

References

1. Ngerncham S, Laohapensang M, Wongvisutdhi T, Ritjaroen Y, Painpichan N, Hakularb P, et al. Lingual frenulum, and effect on breastfeeding in Thai newborn infants. Paediatr Int Child Health. 2013;33(2):86-90.
2. Bai PM, Vaz AC. Ankyloglossia among children of regular and special schools in Karnataka, India: a prevalence study. J Clin Diagn Res. 2014;8(6):36-8.
3. González Jiménez D, Costa Romero M, Riaño Galán I, González Martínez MT, Rodríguez Pando MC, Lobete Prieto C. Prevalance of ankyloglossia in newborns in Asturias (Spain). An Pediatr (Barc). 2014;81(2):115-9.
4. Sethi N, Smith D, Kortequee S, Ward VM, Clarke S. Benefits of frenotomy in infants with ankyloglossia. Int J Pediatr Otorhinolaryngol. 2013;77(5):762-5.
5. Dollberg S, Marom R, Botzer E. Lingual frenotomy for breastfeeding difficulties A prospective follow-up study. Breastfeed Med. 2014;9(6):286-9.
6. Ovental A, Marom R, Botzer E, Batscha N, Dollberg S. Using topical benzocaine before lingual frenotomy did not reduce crying and should be discouraged. Acta Pediatr 2014;103(7):780-2.
7. Rowan-Legg A; Canadian Paediatric Society, Community Paediatrics Committee. Ankyloglossia and breastfeeding. Paediatr Child Health. 2011;16(4):222.
8. Genna CW, Coryllos EV. Breastfeeding and Tongue-Tie. J Hum Lactation. 2009;25(1):111-2.
9. Coryllos E.V, Genna CW, Fram JL. Minimally invasive treatment for posterior tongue tie (hidden tongue-tie) in: Genna CW. Supporting sucking skills in breastfeeding infants. 2nd ed. Jones & Barlett Learning, Burlington, MA 2013:243-51.
10. Garbin CP, Sakalidis VS, Chadwick LM, Whan E, Hartmann PE, Geddes DT. Evidence of improved milk intake after frenotomy: A case report. Pediatrics. 2013;132(5):1413-7.
11. Berry J, Griffith M, Westcott C. A double-blind, randomized, controlled trial of tongue-tie division and its immediate effect on breastfeeding. Breastfeed Med. 2012;7(3):189-93.
12. Emond A, Ingram J, Johnson D, Blair P, Whitelaw A, Copeland M. Randomised controlled trial of early frenotomy in breastfed infants with mild-moderate tongue tie. Arch Dis Child Fetal Neonatal. 2014;99(3):189-95.
13. Geddes DT, Kent JC, McClellan HL, Garbin CP, Chadwick LM, Hartmann PE. Sucking characteristics of successfully breastfeeding infants with ankyloglossia: A case series. Acta Paediatr. 2010;99(2):301-3.
14. Buryk M, Bloom D, Shope T. Efficac of the neonatal release of ankyloglossia: a randomized trial. Pediatrics. 2011;128(2):280-8.
15. Dollberg S, Botzer E, Grunis E, Mimouni FB. Immediate nipple pain relief after frenotomy in breast-fed infants with ankyloglossia: a randomized, prospective study. J Pediatr Surg. 2006;41(9):1598-1600.
16. Garbin CP, Sakalidis VS, Chadwick LM, Whan E, Hartmann PE, Geddes DT. Evidence of improved milk intake after frenotomy: A case report. Pediatrics. 2013;132(5):e1413-7.
17. Dennis CL. The breastfeeding self-efficac scale: Psychometric assessment of the short form. J Obstet Gynecol Neonatal Nurs. 2003;32(6):734-44.
18. Post E, Daamen J, Batemans W. Snipping of a "tongue-tie" in neonates with ankyloglossia and breastfeeding problems: Outcomes and complications. Arch Dis Child. 2012;97(2):486.
19. Kumar M, Kalke E. Tongue-tie, breastfeeding difficultie and the role of frenotomy. Acta Paediatr. 2012;101(7):687-9.
20. Hong P, Lago D, Seargeant J, Pellman L, Magit AE, Pransky SM. Defining ankyloglossia: a case series of anterior and posterior tongue ties. Int J Pediatr

Otorhinolaryngol. 2010;74(9):1003-6.

21. Ata N, Alataş N, Yılmaz E, Adam AB, Gezgin B. The Relationship of Ankyloglossia With Gender in Children and the Ideal Timing of Surgery in Ankyloglossia. Ear Nose Throat J. 2021;100(3):158-60.