

Effect of frenotomy for tongue-tie on improving breastfeeding

Christine Chi-Oi LAM, RN, RM, BNurs, MMid, IBCLC

Sze-Ki WONG, RN, RM, BClinNurs, Master in Obstetric Care, IBCLC

Florence Chi-Ying WONG, RN, RM, IBCLC

Department of Obstetrics and Gynaecology, Queen Elizabeth Hospital, Hong Kong

Introduction: Tongue-tie is a congenital anomaly that may hinder effective breastfeeding. This study aimed to review outcomes of frenotomy on breastfeeding in babies with tongue-tie and their mothers at a lactation clinic.

Methods: Since 2016, the lactation clinic of Department of Obstetrics and Gynaecology, Queen Elizabeth Hospital has taken a more active role to help babies with tongue-tie and breastfeeding difficulties. If feeding problems persisted, the babies were referred to a paediatric hospital for treatment. When indicated, frenotomy was suggested and performed upon consents using bipolar diathermy forceps under no anaesthesia. After frenotomy, the self-rated improvement on feeding condition was assessed in a scale of 0 (no improvement at all) to 10 (excellent improvement). At babies' 4 months of age, mothers were followed up by phone about feeding condition.

Results: From July 2016 to June 2018, 49 babies with tongue-tie and persistent breastfeeding problems were referred for consultation for frenotomy. Of them, four were deemed no need for frenotomy and were excluded, 36 underwent frenotomy and were categorised as the frenotomy group, and the remaining 9 who did not attend consultation or refuse surgery were categorised as the non-frenotomy group. In the frenotomy group, the most common breastfeeding difficulties was poor attachment (61.11%), followed by sore nipples (30.56%), ineffective suckling (5.56%), and poor weight gain (2.78%). After frenotomy, sore nipple was the most improved symptom with a mean rating of 8.18 (n=11), followed by poor attachment with a mean rating of 6.91 (n=22). In the non-frenotomy group, the most common breastfeeding difficulties was poor attachment (55.56%), followed by ineffective suckling (33.33%) and sore nipples (11.11%). At babies' 4 months of age, the proportion of mothers remaining direct breastfeeding was higher in the frenotomy group than the non-frenotomy group (80.56% vs 44.4%, p=0.028). Direct breastfeeding at 4 months was associated with frenotomy (87.88% vs 58.33%, p=0.028).

Conclusions: Frenotomy improved maternal nipple soreness during breastfeeding and the direct breastfeeding rate and duration.

Keywords: Ankyloglossia; Breast feeding

Introduction

Ankyloglossia (commonly known as tongue-tie) is a congenital anomaly characterised by an abnormally short, tight or thick lingual frenum attached near the tip of the tongue. It restricts tongue tip mobility and can cause poor breastfeeding and maternal nipple pain. It is present in 4% to 11% of newborns¹. Frenotomy is commonly performed in Canada², Australia³, and USA⁴ to solve tongue-tie-related breastfeeding difficulties. Frenotomy is a simple surgical incision over the lingual frenulum using scissors, diathermy, or laser to release the restriction of tongue movement and enable more effective suckling.

In Hong Kong, healthcare professionals are increasingly aware of the impacts of tongue-tie on breastfeeding, but frenotomy remains uncommon and scarcely available. The aim of the present study was to review outcomes of frenotomy on breastfeeding in babies with tongue-tie and their mothers at a lactation clinic.

Methods

Since 2016, the lactation clinic of Department of Obstetrics and Gynaecology, Queen Elizabeth Hospital has taken a more active role to help babies with tongue-tie and breastfeeding difficulties. Newborns with suckling difficulties and their mothers were advised by a lactation consultant for breastfeeding attachment during hospital stay. Follow-up assessments were provided after discharge, and breastfeeding assistance and oro-motor training were applied accordingly. If feeding problems persisted, the babies were referred to a paediatric hospital for treatment. When indicated, frenotomy was suggested to the parents and performed upon their consents. Frenotomy was performed using bipolar diathermy forceps under no anaesthesia. At 1 week after frenotomy, the self-rated

Correspondence to: Ms Christine Chi-Oi LAM

Email: lamco@ha.org.hk

improvement on feeding condition was assessed in a scale of 0 (no improvement at all) to 10 (excellent improvement). All babies were followed up until feeding condition became stable. At babies' 4 months of age, mothers were followed up by phone about feeding condition.

The frenotomy group and non-frenotomy group were compared using the Fisher's exact test (if frequency was <5 in $>25\%$ of cells) or the Chi-square test for categorical variables and Mann-Whitney U test for continuous variables. A p value of <0.05 was considered statistically significant.

Results

From July 2016 to June 2018, 54 babies with tongue-tie and breastfeeding difficulties (including poor attachment/latch-on, persistent sore nipples, ineffective suckling, and poor weight gain) were referred to the lactation clinic. Among them, 28 were presented at 5 to 7 days of age, 21 at 8 to 14 days of age, and 5 after 2 weeks (2 of them were presented at 42 or 53 days of age when admitted to an infant ward owing to poor weight gain and feeding difficulty).

Of the 54 babies, four had a mild degree of short frenulum and exhibited no significant suckling problems, one was lost to follow-up, and the remaining 49 were referred to the paediatric hospital for tongue-tie treatment. Among these 49 babies, three did not attend consultation

(who were deemed necessary for frenotomy by our lactation consultant) and 46 were assessed by paediatricians. Of the latter, four were deemed no need for frenotomy and were excluded from analysis. Of 42 babies recommended for frenotomy, 36 underwent frenotomy and were categorised as the frenotomy group, and parents of 6 babies refused to do so. These six babies and the three babies who did not attend consultation were categorised as the non-frenotomy group (Figure).

Tongue-tie was more prevalent in boys ($n=31$) than girls ($n=14$), with a male-to-female ratio of 2.2:1, which is similar to that reported in other studies⁵⁻⁷. The presentation at the lactation clinic was earlier in the non-frenotomy group than the frenotomy group (9.89 days vs 10.89 days, $p=0.035$, Table 1). The proportion of primiparous women was higher in the frenotomy group than the non-frenotomy group (91.67% vs 4.44%, $p=0.004$, Table 1). The mean age for frenotomy was 29.28 ± 11.65 days (mode, 30 days; median [range], 27 [14-73] days).

In the frenotomy group, the most common breastfeeding difficulties was poor attachment (61.11%), followed by sore nipples (30.56%), ineffective suckling (5.56%), and poor weight gain (2.78%). In the non-frenotomy group, the most common breastfeeding difficulties was poor attachment (55.56%), followed by ineffective suckling (33.33%) and sore nipples (11.11%) [Table 1].

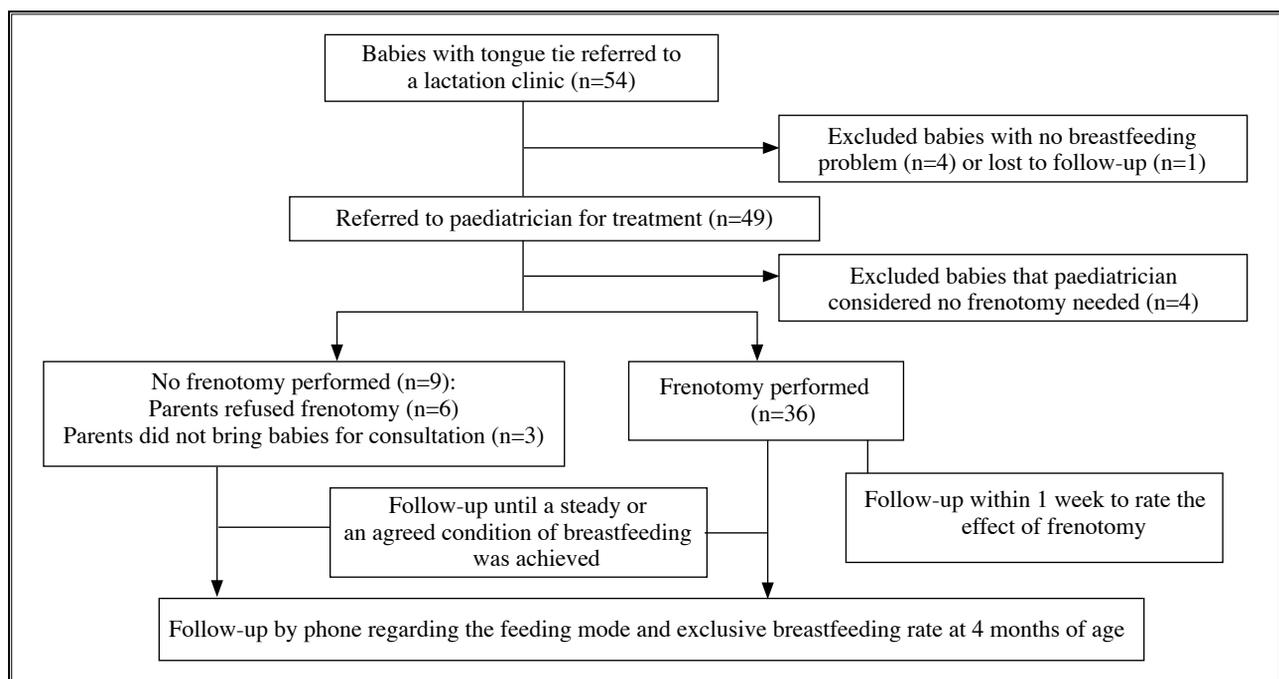


Figure: Flowchart of referral and follow-up of babies with tongue-tie

Table 1. Mother and baby demographics, breastfeeding difficulties, and feeding mode at 4 months

Variable	Frenotomy group (n=36)*	Non-frenotomy group (n=9)*	p Value
No. of male:female babies	27:9	4:5	0.08
Baby body weight, kg	3.07±0.35	3.02±0.39	0.71
Baby age at first presentation to lactation clinic, d	10.89±9.59	9.89±12.09	0.035
Baby age when frenotomy performed, d	29.28±11.65	-	-
Mother age, y	31.67±3.36	31.00±4.85	0.71
Parity			0.004
Primiparous	33 (91.67)	4 (44.44)	
Multiparous	3 (8.33)	5 (55.56)	
Mode of delivery			0.16
Vaginal delivery	25 (69.44)	4 (44.44)	
Caesarean section	11 (30.56)	5 (55.56)	
Working status			0.49
Working	28 (77.78)	6 (66.67)	
Non-working	8 (22.22)	3 (33.33)	
Breastfeeding difficulties			
Poor attachment	22 (61.11)	5 (55.56)	0.76
Sore nipples	11 (30.56)	1 (11.11)	0.238
Ineffective suckling	2 (5.56)	3 (33.33)	0.018
Poor weight gain	1 (2.78)	0 (0.00)	0.61
Feeding mode at 4 months			
Direct breastfeeding	29 (80.56)	4 (44.44)	0.028
Bottle breastmilk feeding	4 (11.11)	3 (33.33)	0.099
Non-breastfeeding	3 (8.33)	2 (22.22)	0.26
Direct exclusive breastfeeding			0.76
Yes	14 (38.89)	3 (33.33)	
No	22 (61.11)	6 (66.67)	

* Data are presented as mean ± standard deviation or No. (%) of cases

Regarding the effect of frenotomy on breastfeeding, sore nipple was the most improved symptom with a mean rating of 8.18 (n=11), followed by poor attachment with a mean rating of 6.91 (n=22) [Table 2].

At babies' 4 months of age, the proportion of mothers remaining direct breastfeeding was higher in the frenotomy group than the non-frenotomy group (80.56% vs 44.4%, p=0.028, Table 1). Direct breastfeeding at 4 months was associated with frenotomy (87.88% vs 58.33%, p=0.028, Table 3).

Discussion

Ultrasonographic studies on breastfeeding revealed that a flexible, extendable tongue is important in efficient

Table 2. Maternal rating on improvement in breastfeeding difficulties after frenotomy

Breastfeeding difficulties	Maternal rating on improvement		
	Mean	Mode	Median (range)
Sore nipple (n=11)	8.18	10 (n=4)	8.00 (4-10)
Poor attachment (n=22)	6.91	10 (n=5)	7.50 (0-10)
Ineffective suckling (n=2)	3.50	-	3.50 (2-5)

removal of breastmilk⁸⁻¹⁰. Tongue-tie is associated with breastfeeding difficulties such as unable to latch-on, unstable suckling, fussy during breastfeeding, poor weight

Table 3. Comparison of direct breastfeeding at 4 months in relation to infant frenotomy and other maternal factors

Variable	Direct breastfeeding for >4 months (n=33)	Direct breastfeeding for <4 months (n=12)	p Value
Baby treated with frenotomy			0.028
Yes	29 (87.88)	7 (58.33)	
No	4 (12.12)	5 (41.67)	
Parity			0.91
Primiparous	27 (81.82)	10 (83.33)	
Multiparous	6 (16.98)	2 (16.67)	
Mode of delivery			0.61
Vaginal delivery	22 (66.67)	7 (58.33)	
Caesarean section	11 (33.33)	5 (41.67)	
Working woman			0.46
Yes	24 (72.73)	10 (83.33)	
No	9 (27.27)	2 (16.67)	

gain, nipple damage, low milk supply, and premature weaning of breastfeeding¹¹⁻¹³. The need for frenotomy for infants experiencing breastfeeding difficulties has been highlighted¹⁴⁻²⁰.

In the present study, mothers who experienced sore nipples reported the highest rating on breastfeeding improvement after frenotomy. Frenotomy was reported to result in a real, immediate improvement in breastfeeding that was detectable by the mother and was well-sustained¹⁴. In a systemic review, frenotomy was reported to reduce breastfeeding mothers' nipple pain in the short term without serious complications, but there was no consistent positive effect on infant breastfeeding²¹. It is suggested that frenotomy may be considered for newborns with tongue-tie causing nipple pain in mothers.

In Hong Kong, the rate of breastfeeding has increased from 44.2% in 1997 to 87.5% in 2018, and the exclusive breastfeeding rate at 4 to 6 months has increased from 6% in 1997 to 29.1% in 2018²². The drop-out of breastfeeding in the first 2 months was the most significant. The primary reasons of breastfeeding cessation 1 month after delivery were reported to be suckling and latching problem (17.1%) and nipple and breast (9.0%)²³. In the present study, the direct exclusive breastfeeding rate at 4 months of age was 38.89% in the frenotomy group, which is higher than the 29.1% reported in a breastfeeding survey of Hong Kong in 2017²². In addition, the breastfeeding rate (direct or bottle) at 4 months was 91.67% in the frenotomy group and

77.78% in the non-frenotomy group, which is higher than the Hong Kong average of 55.7%²². In 2017 in Hong Kong, the breastfeeding rate at birth was 87.5% but it decreased to 76.6% at the first month postpartum²². Mother's perseverance is crucial to successful breastfeeding. We advised mothers with breastfeeding problems to maintain the milk supply by regular milk expression, and to maintain the suckling ability of babies by using alternative feeding methods. Professional support, especially in the early postpartum period, can significantly improve the breastfeeding performance and duration^{24,25}. In the present study, parents were explained that the sole aim of frenotomy was to resume effective direct breastfeeding, and that the present tongue-tie condition and frenotomy were not associated with speech development of babies. With this understanding, the parents' consideration for surgical intervention was focused on improving breastfeeding. Parents' acceptance for surgical intervention to improve breastfeeding was positive. Non-surgical treatments include craniosacral therapy, lactation intervention, and physical/occupational therapy on oral motor training or tongue stretching exercises^{26,27}.

One limitation of the present study is the small sample size. It is difficult to collect a larger number of cases for comparison. Referral was made based on the persistent breastfeeding difficulties despite initial feeding intervention. The analysis of improvement in breastfeeding difficulties after frenotomy was based on maternal perceptions and the proportion of direct breastfeeding.

Standardised clinical assessment tools (such as the Bristol Tongue Assessment Tool and the Hazelbaker Assessment Tool for Lingual Function²⁸) should have been used for diagnosis and follow-up assessment. In the non-frenotomy group, improvement measures such as finger feeding and oro-motor training were applied, and follow-up sessions were stopped when the agreed breastfeeding status was achieved. No further analysis was carried out in this group.

Conclusion

Babies with breastfeeding problems (poor attachment and maternal sore nipples) should be checked for tongue-tie. When tongue-tie is identified as the leading cause for breastfeeding difficulties, early intervention should be provided. Frenotomy can improve attachment

and suckling in breastfeeding. Meanwhile, mothers and babies also need support to maintain optimal breastfeeding. We recommend more training on assessment, non-surgical treatment, and frenotomy for tongue-tie be given to midwives, allied health professionals, and medical staff.

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Conflicts of interest

The authors have no conflicts of interest to disclose.

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