



ANKYLOGLOSSIA IN PEDIATRIC PATIENTS AND ITS MANAGEMENT: A SERIES OF CASE REPORTS.

Dentistry

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ABSTRACT

Ankyloglossia also known as “Tongue Tie”, is a congenital anomaly characterized by an abnormally short thick lingual frenulum, which restricts the possibility of protrusion and elevation of the tongue. Also, it is associated with difficulty in speech articulation and breastfeeding due to limited tongue movement. The parents of infants and toddlers, who notice a “tongue-tie” in their child, are likely to turn first to the pediatric dentists for advice and help. Therefore, this paper reports a series of clinical cases of ankyloglossia in children, and their successful management with Lingual Frenectomy technique intending to familiarize pediatric dentists with this commonly occurring anomaly, which can be relatively easily managed with early diagnosis and proper surgical intervention, thus, enabling the patient to lead a better life.

KEYWORDS

Ankyloglossia. Tongue tie. Frenectomy. Lingual frenum

INTRODUCTION

The term “Ankyloglossia” is defined by Wallace,¹ as the inability to protrude the tongue tip beyond the lower incisors owing to short lingual frenum or a scar tissue. It exhibits an incidence rate of 4.8% in newborns and approximates a ratio of 3:1 in males and females.² Ankyloglossia may occur with increased frequency in various congenital syndromes, including Opitz syndrome, Orofaciodigital syndrome, Beckwith-Wiedemann syndrome, and X-linked cleft palate.³

The tongue elevation which is recorded by measuring the inter-incisal distance with the tongue tip maximally elevated and in contact with the upper teeth has normal values of 20-25 mm or greater in normal children, while children with Ankyloglossia have values of 15 mm or less making articulation of 1 or more of the tongue sounds such as “t,” “d,” “l,” “th,” and “s” difficult for them, thus, may need surgical correction and a speech pathologist consultation.^{3,4}

Hazelbaker developed an assessment tool to quantify the function and appearance of the tongue in infants with Ankyloglossia⁵ (Table I) and Kotlow measured the “free tongue” (the tongue's length from the insertion of the lingual frenum into the tongue's base to the tongue's tip)⁶ (Table II).

The following paper intends to present a series of cases of Ankyloglossia management through surgical intervention in children of different age groups, thus serving as a comprehensive study material to evaluate the success of frenectomy technique in pediatric patients, hence deriving from earlier reported works.

Table I: Hazelbaker's Assessment Tool For Lingual Frenulum Function

Function	Appearance
Lateralization 2- Complete 1- Body of tongue, but not tongue tip 0- None	The appearance of the tongue when lifted 2- Round or square 1- a slight cleft in lip apparent 0- Heart-shaped
Lift of tongue 2- Tip to mid mouth 1- Only edges to mid-mouth 0- Tip stays at the alveolar ridge or tip rises only to mid- mouth with jaw closure and/or mid-tongue dimples	Elasticity of frenulum 2- very elastic (excellent) 1- moderately elastic 0- little or no elasticity
Extension of tongue 2-Tip over the lower lip 1- Tip over lower gum only 0- Neither of the above or anterior or mid- tongue humps and/or dimples	Length of lingual frenulum when tongue lifted 2- >1cm or embedded in the tongue 1- 1cm 0- <1cm

Spread of anterior tongue 2- Complete 1- Moderate or partial 0- Little or none	Attachment of lingual frenulum to tongue 2- Posterior to tip 1- At the tip 0- Notched tip
Cupping 2- Entire edge, firm cup 1- Side edges only, moderate cup 0- Poor or no cup	Attachment of lingual frenulum to the inferior alveolar ridge 2- Attached to the floor of the mouth or well below the ridge 1- Attached just below the ridge 0- Attached at the ridge
Peristalsis 2- Complete anterior to posterior (originates at the tip) 1- Partial, originating posterior to the tip 0- None or reverse peristalsis	
Snapback 2-None 1-Periodic 0-Frequent or with each suck	
Scoring 14= Perfect score (regardless of appearance item score) 11= Acceptable, if appearance item score is 10 <11= Function impaired Frenotomy is necessary if the function score is <11 and the appearance score is <8.	

Table II: Classification Of Ankyloglossia Based On “Free Tongue” Length According To Kotlow

Clinically acceptable, normal range of free tongue=>16 mm
Class I: mild ankyloglossia=12-16 mm
Class II: moderate ankyloglossia=8-11 mm
Class III: severe ankyloglossia=3-7 mm
Class IV: complete ankyloglossia=<3 mm

CASE REPORTS

A 9-year-old female patient (Case no. 1), an 11-year-old male (Case no. 2), a 7-year-old male (Case no. 3) and a 4-year-old male patient (Case no. 4) reported to the Department of Dentistry with the chief complaint of restricted tongue movements and improper speech thus facing social embarrassment (mainly in older age groups).

Clinical examination: revealed short thick lingual frenum with anterior insertion, and limited tongue protrusion and elevation movements in all the four cases [Figures I (A) & (B)] (Case 1), [Figures I (C) & (D)] (Case 2), [Figures I (E) & (F)] (Case 3), [Figures I (G) & (H)] (Case 4).



Figure I: Pre-operative views showing short thick lingual frenum with anterior insertion and limited tongue extension. A) & B) 9-year old with ankyloglossia (Case 1). C) & D) Ankyloglossia in 11-year old showing heart-shaped tongue during protrusion (Case 2). E) & F) Pre-operative-views showing short thick lingual frenum made visible by retracting the tongue with two gloved fingers towards the palate and bifid tongue on attempted extension in 7-year old (Case 3). G) & H) A 4-year-old showing heart-shaped tongue during protrusion due to anterior insertion of lingual frenum (Case 4).

Diagnostic Assessment: All 4 cases were clinically assessed by Kotlow's criteria and were found to be of moderate (Class II) and severe (Class III) categories and Hazelbaker's assessment tool revealed function scores to be <11 and appearance scores to be < 8 (Tables III & IV). Speech analysis was done to identify defective speech. Thus, seeing the diagnostic scores, surgical approach (Frenectomy) was decided upon for better prognosis and the patient's parents were informed about the nature, functional implications of the lesion, the required surgical approach and informed written consent was obtained. The patient's family, medical and genetic histories were non-contributory. General physical examination revealed insignificant findings and hematological findings were within the normal range.

Lingual frenectomy: After antisepsis and topical anesthetic application on the undersurface of the tongue, bilateral lingual nerve blocks and local infiltration in the anterior area were performed with 2% lidocaine (1:200,000 Epinephrine). A 3-0 silk suture on the tip of the tongue was used for traction in the first case due to lack of patient compliance [Figure II (A)]. In the rest three cases, the tongue was lifted gently by the placement of 2 gloved fingers of the left hand below the tongue on either side of the mid-line, retracting the tongue upward towards the palate [Figure I (E)]. The frenulum was held with a hemostat and the first incision was made at the upper aspect and second incision was made at the lower aspect of the frenulum, close to the floor of the mouth with a #15 surgical blade [Figures II (A) & (B)] (Cases 1 & 2), after excising the frenulum [Figure II (C)] and undermining the wound margins with the tips of blunt-ended dissecting scissors [Figure II (D)], a diamond-shaped wound was left [Figures II (E), (F) & (G)] (Cases 1, 3 & 4). Fiber remnants were excised and tension-free closure was done with 3-0 silk sutures [Figures II (H), (I) & (J)] (Cases 1, 3 & 4). The patients were discharged with post-operative instructions. Antibiotic coverage and the nonsteroidal anti-inflammatory drug were given for 5 days.

Postoperative period: was uneventful in all the cases and the remaining sutures were removed after 7 days with no scar tissue formation [Figure III (A), (B) & (C)]. Various tongue exercises were advised to the patients like stretching the tongue towards the nose tip and then towards the chin, licking the upper and lower lip from one side to other and vice-versa and opening the mouth wide trying to touch the upper front teeth, following which the patients were sent for speech therapy sessions.

RESULTS

After a follow-up of 1-2 months, the tongue showed good healing, protrusion of several mm beyond the lower lip [Figure III (D), (E), (F) & (G)], and improved speech owing to good compliance of the patients. Kotlow's criteria showed improved scores from 7, 9, and 8

mm to 13, 14, and 15 mm postoperatively (Table III), and Hazelbaker's assessment tool showed improved functional scores of 14, 13, 12 from 9, 10, and 10 and increased appearance scores of 9, 9, and 10 from 6, 6, and 7 postoperatively (Table IV). Patients were satisfied and contented with the outcome of the treatment they received.

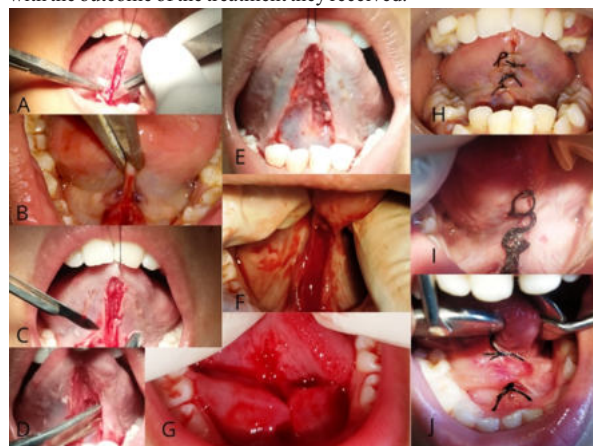


Figure II: A) Tongue being held up towards the palate with suture material and frenectomy incision using a scalpel (Case 1). B) Frenulum being held with a hemostat facing the ventral surface of the tongue (Case 2). C) Removal of intervening fibrous tissue (Case 1). D) Wound margins undermined with the tips of blunt-ended dissecting scissors (Case 1). E), F) & G) Diamond-shaped wound after excising the frenulum tissue (Cases 1, 3 & 4). H), I) & J) Sutures placed (Cases 1, 3 & 4).



Figure III: A), B) & C) Clinical aspect of the surgical site on the 7th postoperative day showing uneventful healing following suture removal (Cases 1, 2 & 3). D), E), F) & G) Post-operative-views after-2 months showing adequate tongue extension (Cases 1, 2, 3 & 4).

Table III: Pre-operative & Post-operative Assessment Of Free Tongue Length In All 4 Cases Using Kotlow's Criteria

Case no.	Pre-operative Free-tongue Length	Kotlow's classification	Post-operative Free-tongue Length	Kotlow's classification
1	8mm	Class II	14mm	Class I
2	10mm	Class II	15mm	Class I
3	7mm	Class III	14mm	Class I
4	9mm	Class II	16mm	Class I

Table IV: Pre-operative & Post-operative Assessment Of Functional And Appearance Scores Of All 4 Cases Using Hazelbaker's Assessment Tool

Case no.	Pre-operative function score	Pre-operative appearance score	Post-operative function score	Post-operative appearance score
1	10	7	14	10
2	10	6	13	10
3	9	6	12	9
4	9	7	14	10

DISCUSSION

The present work, reported a case series of children, diagnosed with ankyloglossia who were approached with frenectomy technique.

Correct diagnosis and early intervention of ankyloglossia is important, otherwise it may cause restricted tongue movement, malocclusion, lower incisor deformity, gingival recession, speech articulation abnormalities, social problems and feeding difficulties.^{2,3,4,7}

The surgery is indicated if the evaluation shows that function may be improved by surgery and timely intervention at an early age can reduce long-term complications.⁸ Speech articulation problems are the most common indications for lingual frenulum surgery in preschool children.⁷

The several conservative options like observation, speech therapy, otolaryngotherapy should be considered before opting for more invasive surgical procedures viz. frenotomy, frenectomy, Z-plasty, and laser frenectomy.

Frenotomy (clipping of lingual frenulum), is a simple quick conservative technique, mostly indicated for babies, but has a possibility of recurrence, thus, requires adjunctive procedures for releasing tongue-tie satisfactorily.^{9,10}

Frenectomy is the complete excision of the frenulum, which is more invasive, although the results are more predictable, thus, decreasing the recurrence rate.^{10, 11} As such literature suggests no definitive parameters regarding the timing of frenectomy, however, surgery should be performed before the child develops abnormal swallowing and speech patterns and when performed in older children, they should be referred to a speech therapist to re-establish the normal functions of the tongue.¹¹

In the above cases, frenectomy was performed using hemostats to delimit the area to be excised as well as to guide the incisions.

Frenuloplasty, involves surgical alteration (horizontal to vertical division) of anatomic situation of frenulum.⁷

Laser frenectomy is an alternative to the surgical technique which is comparatively less invasive and with little post-operative discomfort.¹²

The only limitation of the present study is the conventional surgical approach, which is bit more invasive and demands more post-operative care than the laser technique. But this surgical technique holds relevance for the dentists who do not have extensive laser setups and in developing countries where maximum patients cannot afford expensive treatments.

CONCLUSION

This paper reports a series of cases of pediatric age group ranging from 4-11 years requiring tongue-tie revision, thus provides a one-stop destination to compare the success of frenectomy technique in younger as well as older age group of children. So, the objective of this paper is to offer guidelines for diagnosis and treatment of a tongue-tie and to encourage dentists not familiar with the procedure to study the technique and incorporate it into their practice to facilitate early treatment of this relatively common disturbance. The results of our study demonstrate that the surgical technique of frenectomy improves lingual mobility and gives excellent results if reinforced with rehabilitation exercises and good patient collaboration.

Acknowledgement: Authors are grateful to the study subjects and their guardians for their valuable co-operation and support without which completion of this study could not have been possible.

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