

Frenectomy management for Ankyloglossia in a 1-Year-old patient under general anesthesia: A case report

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Abstract

Introduction: Ankyloglossia is defined as a congenital disorder that alters tongue mobility and function. It is listed as one of the possible reasons behind breastfeeding issues. The WHO currently recommends mothers to breastfeed exclusively up to 6 months of age, emphasizing the importance of promptly identifying any breastfeeding obstacles and determining the root cause of the problems as the primary focus. The purpose of writing this article is to describe a frenectomy as a surgical procedure that addresses ankyloglossia by excising the lingual frenulum with general anesthesia.

Case History: A 1-year-old male patient presented at Dr. Saiful Anwar Regional General Hospital with complaints of difficulty in breastfeeding and consuming complementary foods, as well as prolonged pain experienced by the mother during breastfeeding. The patient had no history of systemic diseases such as heart disease or blood disorders, and there were no known allergies to food or medications. The patient was uncooperative (Frankl scale number 1). After analyzing the ankyloglossia, the choice of frenectomy with general anesthesia was chosen to treat this case.

Discussion: Dental examinations and treatments for uncooperative 1-year-old children can be challenging in regular dental offices. Effective behavioral management, such as general anesthesia (GA), is required for safe and efficient treatment. GA involves a multidisciplinary team to oversee the procedure stages, allowing for one-visit treatment, reduced anxiety, and a safer, less painful dental experience.

Conclusion: Frenectomy procedure under GA has been performed as an option to facilitate restorative therapy, improve nutritional intake, and quality of life.

Keywords: Ankyloglossia; Frenectomy; General Anesthesia; Quality of life

1. Introduction

Ankyloglossia is a developmental disorder of the tongue characterized by a prominent lingual frenulum attached high on the lingual alveolar ridge, with a thick lingual frenulum resulting in limitation of tongue movement (partial ankyloglossia) or the tongue appearing to be fused to the floor of the mouth (total ankyloglossia) [1]. Ankyloglossia is caused by persistence of tissue in the ventral lingual midline due to failure of apoptosis in the sublingual area during embryogenesis [2]. The prevalence of ankyloglossia in infants is estimated to range from 0.1% to 12.11%, but this wide range reflects variations in criteria for ankyloglossia both anatomically and symptomatically. There is a male predominance in cases of ankyloglossia, with a male-to-female ratio ranging from 1.1:1 to 3:1 [3].

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Examination of the oral cavity of newborns should include an assessment of tongue appearance, shape, position, and function in both relaxed and moving states, frenulum elasticity, length of the free tongue, as well as the size of lingual frenulum attachments to the tongue, the floor of the mouth, and the inferior alveolar ridge. Normally, the frenulum is attached to the tongue approximately 1 cm behind the tip of the tongue [4]. There are several evaluation tools for diagnosing lingual frenulum and its function during breastfeeding, such as the Hazelbaker Tool, the Linguinha test, Coryllos classification, and the Bristol Tongue Assessment Tool (BTAT-TABBY) [5,2]. Ankyloglossia, according to Kotklow, can be classified into four classes based on the distance of the lingual frenum insertion to the tip of the tongue. The normal distance of the free tongue is about 16mm, Class I: Mild Ankyloglossia: 12 to 16mm, Class II: Moderate Ankyloglossia: 8 to 11mm, Class III: Severe Ankyloglossia: 3 to 7mm, Class IV: Complete Ankyloglossia: less than 3mm [6].

Ankyloglossia can affect various aspects, including speech (especially in pronouncing the letters t, d, l, th, and s), the process of chewing food, breastfeeding, oral hygiene, and social interactions. Severe forms of ankyloglossia often lead to a gap in the middle of the lower jaw, gum damage such as gum pulling around the lower front teeth or gaps between the teeth due to pressure generated by tissue behind the lower front teeth [7]. Among breastfeeding mothers, there is a higher prevalence of nipple pain in mothers breastfeeding babies with ankyloglossia compared to mothers breastfeeding babies without ankyloglossia. Other problems associated with reduced tongue mobility may include discomfort, difficulty licking lips, maintaining dental hygiene, and so on [1].

Treatment options for ankyloglossia involve timely and appropriate surgical intervention, followed by speech therapy that often yields satisfying results, sometimes faster than expected. Surgical interventions to address ankyloglossia include conventional techniques using hemostats, electrocautery, and laser [8]. The most common method to correct ankyloglossia is by surgically excising the abnormal frenulum through a process known as frenotomy, frenectomy, or frenuloplasty [9]. Frenectomy is one of the preprosthetic surgical procedures, a simple procedure where a portion or the entire problematic frenulum is surgically removed with the aim of restoring oral health balance and retention as well as stability of dental prostheses [7].

The decision to utilize general anesthesia must take into account alternative behavioral modulation, patient's dental needs, as well as their emotional and medical status. General anesthesia is warranted in a small and specific subset of patients such as very young children under the age of three requiring complex dental treatment, those who are not amenable to procedures under conscious sedation, and those with special needs. Infants, children, and even adolescents with cognitive or psychological disorders are predominantly those requiring general anesthesia to safely undergo dental procedures [10]. General anesthesia is preferred by doctors to perform comprehensive dental treatment in patients with severe disorders based on safety and efficacy aspects [11].

2. Case History

A 1-year-old boy patient presented at Dr. Saiful Anwar Regional General Hospital with complaints of difficulty in breastfeeding and consuming complementary foods, as well as prolonged pain experienced by the mother during breastfeeding. The patient had no history of systemic diseases such as heart disease or blood disorders, and there were no known allergies to food or medications. The patient's height is 74 cm, and their weight is 8.5 kg. The parents of the patient wish for treatment on their baby's tongue to prevent further difficulties during feeding and swallowing, as well as to reduce pain for the mother's nipples during breastfeeding. Upon extraoral examination, everything appears normal, with no swelling or redness observed. However, during intraoral examination, a thick and short lingual frenulum is found (Figure 1). The patient is unable to protrude his tongue. In addition, since the first visit, the patient had shown very uncooperative behavior. Based on the Frankl behavioral rating scale, the patient showed a rating scale of 1, which is definitely negative [12]. Because of these conditions, it was decided to undergo comprehensive dental treatment under GA.

GA was carried out after an examination by a pediatrician and anesthesiologist. Several examinations of systemic conditions were carried out including complete blood cell test, thorax examination. All examinations showed normal and controlled conditions. Before the procedure, the patient was instructed to fast for 6 hours. GA was performed with an endotracheal tube through the mouth and Midazolam 1 mg, ketamine 1 mg, fentanyl 150 mcg, atracurium 15mg was induced also inhalation with midazolam.

After the patient was anesthetized, frenectomy was performed with initial aseptic steps (Figure 2a), followed by fixation of the upper and lower lingual frenulum (figure 2b), then cutting with surgical scissors, freeing the area of the lingual frenulum (figure 2c). Subsequently, 6 sutures were applied using vicryl 4.0 (absorbable silk) (figure 2d). The tongue appears to be able to protrude (Figure 2e). Antibiotic instructions for 6 hours post-operation included intravenous

Cefazolin 100mg. After all procedures had been completed, the patient's parents were given instructions, including allowing the patient to drink once consciousness had recovered well, avoiding hot or warm foods and drinks, refraining from playing with scars, instructions for maintaining oral hygiene, scheduling routine follow-up visits, and performing periodic tongue massages.



Figure 1 Intraoral Examination

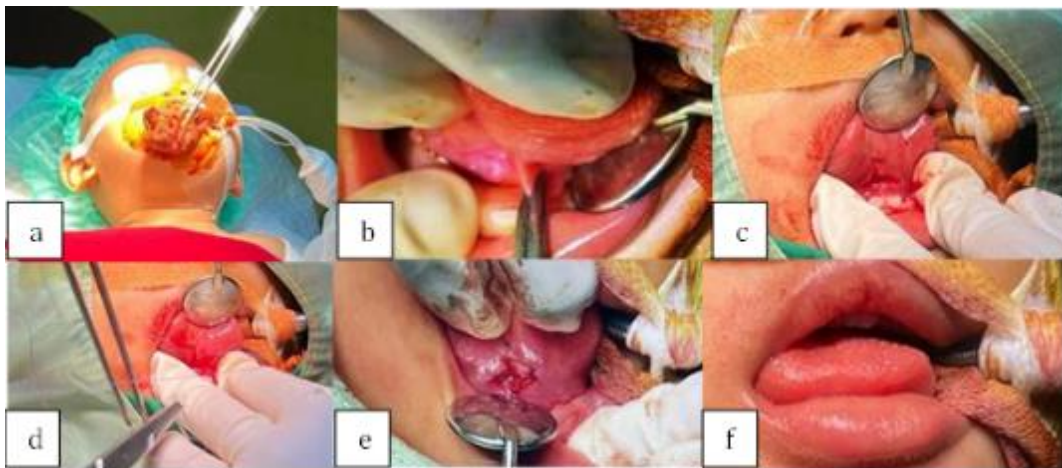


Figure 2 Intraoral photography depicts the frenectomy procedure performed under general anesthesia. Figure 2a: Aseptic conditions. Figure 2b: Fixation of the lingual frenulum. Figure 2c: Lingual frenulum fixation. Figures 2d and e: Application of 6 Vicryl 4.0 (absorbable suture) stitches. Figure 2f: Visible protrusion of the tongue.



Figure 3 Intraoral photograph after 1 week

One week later, a follow-up examination was conducted, and the patient's parents acknowledged that the patient had never experienced pain and their appetite had increased. The mother experienced no discomfort while breastfeeding and could do so comfortably. Upon intraoral examination, post-frenectomy wounds were observed without any

observed redness or swelling (Figure 3). Lastly, follow-up instructions were provided to maintain oral hygiene and perform tongue massages periodically.

3. Discussion

Tongue-tie in newborns is associated with breastfeeding difficulties, linked to the importance of tongue movement in extracting breast milk from the nipple during nursing, as well as the tongue exerting stronger pressure on the nipple causing pain, which can reduce the effectiveness of breastfeeding [13]. Women with infants experiencing breastfeeding difficulties and subsequently undergoing frenectomy should receive ongoing lactation training post-operatively [14]. Children with tongue-tie experience articulation difficulties in speaking certain sentences. In some cases, it has been demonstrated that tongue-tie can lead to maxillary hypoplasia (abnormality of the upper jaw bone), which can subsequently affect speech difficulties, nasal obstruction, mouth breathing, and sleep apnea [15]. Articulation disorders, commonly known as lisps, can occur due to the lingual frenulum located beneath the tongue, preventing the tip of the tongue from functioning properly [16].

Doctor should examine the appearance of the tongue when the baby cries or attempts to extend the tongue. When lifting the baby's tongue, the frenulum should be palpated, and its elasticity determined. Attachment of the frenulum to the tongue should typically be about 1 cm posterior to the tip of the tongue. Attachment of the frenulum to the inferior alveolar ridge should be proximal or to the genioglossus muscle at the base of the mouth. Mothers should be interviewed regarding the baby's ability to breastfeed [17]. Diagnosis of tongue-tie can be observed from congenital abnormalities characterized by a short lingual frenulum, functional disturbances of the tongue, and symptoms caused by the frenulum [18].

Lingual frenectomy in children is recommended as early as possible because it aids in speech development, jaw growth, and alleviates potential functional impairments [7]. The most common method to correct ankyloglossia is through surgical excision of the abnormal frenulum, a process known as frenotomy, frenectomy, or frenuloplasty [9]. It is expected that frenectomy can improve speech articulation in children with tongue-tie [17]. Surgery performed as therapy for tongue tie is frenectomy. Frenectomy is one of the preprosthetic surgical procedures. It is a simple procedure where a portion or all of the problematic frenulum is surgically removed with the aim of restoring oral health balance and retention as well as stability of dentures [7].

Several behavioral assessment tools have been devised to evaluate a child's conduct during dental appointments, with one of the most prevalent being the Frankl rating scale. The Frankl rating scale divides a child's behavior into four categories, ranging from rating 1 (clearly negative), 2 (negative), 3 (positive), to 4 (clearly positive). In this instance, the patient displayed uncooperative behavior. In line with the theory, this corresponds to a Frankl Scale rating of 1, indicating resistance to treatment, involuntary crying, or other conspicuous signs of extreme negativity [12]. This patient showed an uncooperative attitude because his young age, 1 year old.

The use of general anesthesia is widespread in facilitating dental procedures for patients experiencing anxiety or exhibiting challenging behavior, particularly among children or those with special needs. Prior to administering general anesthesia, dental practitioners must conduct a comprehensive pre-operative evaluation and ensure that patients are fully informed about potential risks, obtaining informed consent. These measures contribute to optimal patient care and decrease the incidence of complications associated with this sedation method [19]. While general anesthesia is considered a safe and routine medical practice, complications during and after surgery may arise due to human error or patient-specific factors [20]. Thus, a thorough pre-general anesthesia risk assessment is an essential component of the general anesthesia protocol. It's worth noting that despite its advantages, general anesthesia poses an economic and financial burden on healthcare providers, necessitating specific hospital infrastructure tailored to the complexity of planned procedures, as well as the expertise of anesthesiologists and an interdisciplinary team to deliver safe and effective care [21].

4. Conclusion

General anesthesia is indicated for select patients, including infants under three years old requiring complex dental procedures, individuals not responsive to conscious sedation, and those with special needs.

Compliance with ethical standards

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Disclosure of conflict of interest

The authors declare that there is no conflict of interest regarding the publication of this document.

Statement of informed consent

Informed consent was obtained from patient included in the study.

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