Thermal welding frenotomy on neglected tongue tie: a case report

Rizka Fakhriani¹*, Fadli Robby Amsriza²

ABSTRACT

Introduction: Tongue tie, also known as ankyloglossia, is characterized by a small lingual frenum that often prevents the tongue from moving. It is a rare congenital mouth abnormality that might lead to functional problems such as improper swallowing, speech difficulty, and psychological stress. This study's purpose of providing an unusual incidence of neglected tongue tie with thermal welding frenotomy.

Case Presentation: A 4 years old male patient was bought by his parent to the Department of Otorhinolaryngology-Head and Neck Surgery with the chief complaint of offensive speech. The patient cannot speak the word F, R, T, L, D. Additionally, the parent said that he was unable to chew solid meals. There was a history when the patient was a baby; his mother could not breastfeed him. According to the clinical examination, the patient had a tongue tie with a thick frenum, limited tongue movements like protrusion, and elevation of the tongue tip. A bifid or heart-shaped structure was seen on the front tongue tip.

Discussion: The patient underwent a thermal welding frenotomy under intravenous sedation. This approach's effectiveness relies on using heat and pressure to block blood arteries. This study established the novel technology as a secure procedure for tongue tie. After a frenotomy procedure, patients show an improved ability to articulate consonants better.

Conclusion: This study supports thermal welding frenotomy as an efficient and secure treatment for children with tongue tie.

Keywords: Ankyloglossia, Children, Congenital, Tongue Tie
INTRODUCTION

Tongue tie, also known as ankyloglossia, is characterized by a small lingual frenum that often prevents the tongue from moving. It is a rare congenital mouth abnormality that might lead to functional problems such as improper swallowing, speech difficulty, and psychological stress (Saskianti et al. 2019). The reported prevalence of tongue-tie varies between less than 1% and 10-12%. Tongue-tie exhibits a higher prevalence among males, displaying a male-to-female ratio of 3:1. Currently, there is a lack of national epidemiological data on tongue-tie in Indonesia. There is a common belief that there are no apparent epidemiological variations across different ethnicities globally (Messner et al. 2020; Wei et al. 2020). Meissner’s study found that speech problems caused by limited tongue movement occurred in 71% of tongue-tied children (Wang et al. 2022).

Speech is necessary for a child’s psychosocial development. Children who have speech problems experience social stigma. The sound is created by the varied placements and motions of the articulation system’s mobile and fixed components. It could be challenging to make certain sounds if the tongue is restricted (Chandrasekaran et al. 2020; Lichnowska & Kozakiewicz 2021). Additionally, chewing and oral hygiene may be impacted by ankyloglossia. The most common surgical therapy is frenotomy, which may be divided into the simple release (frenotomy, frenulotomy, or frenectomy) and suturing-followed surgery (frenuloplasty). Additionally, conventional and laser therapy may be used to treat tongue-tie separation (Khan et al. 2020; Wang et al. 2022). This study’s purpose of providing an unusual incidence of neglected tongue tie with thermal welding frenotomy.

CASE PRESENTATION

A 4 years old male patient was brought by his parent to the Department of Otorhinolaryngology-Head and Neck Surgery with the chief complaint of offensive speech. The patient cannot speak the word F, R, T, L, D. Additionally, the parent said that he was unable to chew solid meals. There was a history when the patient was a baby; his mother could not breastfeed him. According to the clinical examination, the patient had a tongue tie with a thick frenum, limited tongue movements like protrusion, and elevation of the tongue tip. A bifid or heart-shaped structure was seen on the front tongue tip. The mouth was thoroughly examined with a tongue depressor under suitable lighting to determine the degree of the restriction of tongue mobility (Figure 1). There was no information about the patient’s medical or family history of tongue tie. The patient's height and weight were appropriate for their age. The results of the ENT physical examination revealed no insignificant findings. The patients’ hematologic analysis was within normal limits. The objective examination determined type 2 tongue-tie (Coryllos classification); the surgical repair should be associated with speech therapy. Intravenous sedation was utilized for the surgery since the patient was uncooperative. The patient underwent a thermal welding frenotomy.

Figure 1. Type 2 tongue-tie (Coryllos classification)
DISCUSSION

There are four different types of frenula based on the location of the upper and lower injection, according to Coryllos’ categorization of tongue ties: type one has a connection on the tongue’s tip, and the second on the alveolar ridge; type two has the lower connection on or just behind the alveolar ridge; type three has the frenulum stretched from the center of the tongue to the center of the surface of the mouth; and type four is connected to the tongue’s base. Although the first and second forms (both of which have functional impairment) are related to anterior tongue tie, the third and fourth forms (both of which have functional impairment) are linked to posterior tongue tie (Dell’Olio et al. 2022a; Narsat et al. 2022).

There is research linking tongue tie with mothers’ difficulty breastfeeding. However, there are no studies linking lingual frenulum anatomical variations to the functions of sucking and swallowing, which require tongue movements (Campanha, Martinelli & Palhares 2019). Tongue tie reduces the efficacy of milk sucking during breastfeeding by restricting tongue mobility (Campanha et al. 2019). Children with tongue tie usually have speech problems and articulation issues (Lichnowska & Kozakiewicz 2021).

The most difficult consonants to pronounce are the lingua-alveolar and lingua-dental ones, l, t, r, d, and th, which require the tongue to resist the palate or alveolus. Despite the stated issues, the tongue is adaptable, phonation is often expected, and most often, there are no obvious speech impediments (Saskianti et al. 2019). Furthermore, tongue movements are most important in speech production, and this condition may harm speech, leading to speech sound disorder (SSD) (Ghayoumi-Anaraki et al. 2022). Our patient, however, experienced articulation issues. He struggled with speaking sounds, including "f," "t," "l," and "d," as well as rolling his "r." Speech therapy should be considered before and after
tongue tie treatment to assist the patient in recovering their speech (Ito et al. 2015; Ghayoumi-Anaraki et al. 2022). If a speech therapist’s intervention is ineffective in treating speech and tongue-related problems, surgical treatment may need to be considered. Even in adults and newborns, surgical procedures are entirely safe. Additionally, for the best outcomes, postoperative tongue retraining and speech therapy is required (Belmehdi, El Harti & El Wady 2018).

Patients should be educated about tongue tie and their long-term effects to seek adequate treatment. It is suggested to start the therapy as soon as possible, preferably from birth, to get the most significant effects (Khan, Sharma & Sharma 2017; Ghaeri, Cole & Mace 2018; Chavez et al. 2022). Treatment could be necessary if tongue-tie pain interferes with eating, speaking, or maintaining dental hygiene (Sharma et al. 2020). For loosening a tight lingual frenulum, there are two main procedures: frenoplasty or Z-plasty and frenotomy, which may be conventional or laser.

The frenotomy procedure involves the tongue's retraction to expose the lingual frenulum, followed by a precise incision made with sterile cutting scissors. The surgical cut is performed close to the ventral region of the tongue, with careful attention to avoid any contact with the openings of the sublingual and submandibular glands. The incision location of the frenotomy treatment does not necessitate the use of sutures, and the child can eat promptly. Harmonic scissors may also remove a tongue tie without bleeding. The harmonic scissor uses ultrasonic radiation to coagulate and cut vessels up to 2 mm in diameter without losing heat energy, minimizing collateral damage, healing time, and recurrence (Mir et al. 2022).

A randomized controlled experiment was conducted to assess the effects of frenotomy on speech intelligibility and speech errors in children diagnosed with moderate to severe tongue-tie. The results indicated that frenotomy led to improvements in speech intelligibility (Maya-Enero et al. 2022). A separate study revealed that frenotomy positively affected speech intelligibility among children diagnosed with ankyloglossia (Dell’Olio et al. 2022b; Towfighi et al. 2022). In general, several studies indicate that frenotomy is a safe and effective intervention for the management of tongue-tie. It has yielded favorable outcomes, exhibiting an impressive success rate and leading to significant improvements in breastfeeding, bottle-feeding, speech, eating, and swallowing abilities among individuals across various age groups, including newborns, children, and adults affected by tongue-tie (Callea et al. 2023).

In this case, the frenotomy was performed using the Thermal Welding (TW), often utilized in tonsillectomy procedures. This approach's effectiveness relies on using heat and pressure to block blood arteries. The apparatus has a heat source in one arm, activated by a low-voltage electrical current ranging from 300 to 400 degrees celsius. The heat source is applied forcefully against an opposing arm to provide the optimal pressure required for tissue fusion and division. Moreover, the tissue fusion and division process are accompanied by evaporation occurring inside the confined region in contact with the heat source (Albazee et al. 2023). Recent studies that evaluated the effectiveness of this novel technology discovered that the TW causes very little tissue damage (Alkun 2018). This study established the novel technology as a secure procedure for tongue tie. After a frenotomy procedure, patients show an improved ability to articulate consonants better.

CONCLUSION

The present study shows that using a thermal welding system for frenectomy provides better patient feedback in minimizing post-operative discomfort and bleeding. By looking
at the advantages, when utilized appropriately, thermal welding frenectomy can serve as a secure and efficient option in incidences of tongue tie.

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**REFERENCES**


