

A Small Cut, A Big Leap Forward: Electrocautery -Assisted Lingual Frenotomy in a Pediatric Patient: A Case Report

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ABSTRACT

Ankyloglossia, or tongue-tie, is a congenital condition marked by a short or restricted lingual frenulum, which limits tongue movement. Lingual frenotomy is a highly effective procedure to correct ankyloglossia and alleviate resultant functional challenges such as speech articulation difficulties especially in young children. A four-year-old male child reported with the primary complaint of speech difficulty and restricted tongue mobility. Clinical examination revealed Kotlow's Class II tongue-tie. Following administration of local anesthesia, the lingual frenotomy was performed using electrocautery, enabling precise release of lingual frenulum with effective hemostasis. No intraoral sutures were required. At the one-week post-treatment visit, clinical assessment revealed significantly improved tongue mobility and speech articulation, highlighting electrocautery-assisted lingual frenotomy as a safe, efficient, and effective technique for treating ankyloglossia in young children.

Keywords: Ankyloglossia; electrocautery; frenotomy.

INTRODUCTION

Ankyloglossia, commonly referred to as tongue-tie, is a congenital anomaly of the tongue characterized by the presence of an abnormally short, thick, muscular or fibrotic frenulum which restrict tongue tip mobility.^{1,2} While mild cases may be asymptomatic, moderate to severe tongue tie can impair essential functions such as speech articulation and breast-feeding. Older children may experience psychosocial challenges and lower self-esteem that can impair interpersonal communication. Prevalence of ankyloglossia has been reported between 0.02-11% with males being more affected than the females (2.5:1).^{3,4}

This condition arises when the embryological tissue remnant that usually undergoes apoptosis, fails to regress, leading to a persistent attachment between tongue and the floor of the mouth.^{5,6} It can occur

as an isolated anomaly or as a part of congenital syndromes including cleft lip and palate, Van der Woude syndrome, Oro-digito-facial syndrome, and Opitz syndrome.³ Prognosis remains good with some cases remaining asymptomatic, while others require intervention due to functional limitations.^{6,7}

Management of ankyloglossia depends upon severity of the symptoms and the patient's age. While mild cases may not require intervention, moderate to severe forms often necessitate surgical treatment.⁸ Unless there are obvious speech or nursing difficulties, delay in treatment of a

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short lingual attachment is often recommended.⁹ Treatment options such as observation, speech therapy, frenotomy and frenectomy with scalpel, electrocautery and lasers, have all been suggested in the literature.

Conventional surgical methods using scissors or a scalpel are cost-effective but often cause more bleeding and pain. Electrocautery, in particular, offers the benefits of precise incision, simultaneous hemostasis and reduced need for the sutures, making it highly suitable for pediatric patients.¹⁰ This case report aims to highlight the clinical efficacy, advantages, and postoperative outcomes of electrocautery-assisted lingual frenotomy in a young child presenting with speech difficulties.

CASE REPORT

A four-year-old male child reported to the Department of Pedodontics and Preventive

Dentistry, B.P. Koirala Institute of Health Sciences, Sunsari, Dharan, Nepal with a chief complaint of difficulty in speech. It was his first dental visit and his behavior was positive according to the Frankel behavior rating scale.⁸ Intraoral examination showed restricted tongue mobility with a heart-shaped appearance on protrusion (Figure 1a). On functional assessment, tongue mobility was restricted during elevation, protrusion, and lateral movements (Figure 1b). The free tongue length was measured to be 8.5 mm with the frenulum attaching from the tongue tip to the mandibular ridge (Figure 1c). Based on Kotlow's classification, the condition was diagnosed as Class II ankyloglossia (free tongue length measured 8–11 mm by measuring the distance of the insertion of the lingual frenum to the tip of the tongue)⁴ (Table 1). The patient exhibited articulation difficulties, particularly with the words beginning with sounds “t,” “d,” “l,” “th,” and “s”.



Figure 1: Pre-operative intraoral photographs. (1a) Heart-shaped tongue during protrusion (1b) Limited lateral movement of tongue (1c) Thick, fleshy, lingual frenulum.

Table 1: Kotlow's classification of Ankyloglossia based on “Free Tongue” Length⁴

Classification of Ankyloglossia	Range of free tongue length
Clinically acceptable, normal range of free tongue	>16mm
Class I	12-16mm
Class II	8-11mm
Class III	3-7mm
Class IV	<3mm

After parental written informed consent and assent from child, and routine hematological investigations, lingual frenotomy was planned using electrocautery, followed by tongue exercises and speech therapy. The decision to perform lingual frenotomy was based on the presence of mild to moderate ankyloglossia with a thin, anteriorly attached frenum and no deep muscular involvement. In such cases, frenotomy is preferred as it provides adequate functional release while being minimally invasive. Electrocautery was chosen for its precision, effective hemostasis, no requirement of postoperative suturing, shorter procedure time and more comfortable healing which is particularly beneficial for pediatric patients.

Given the child's age and positive behavior rating, basic behavior guidance techniques such as Tell–Show–Do, positive reinforcement, use of a calm reassuring voice, parental presence, and simple

distraction were employed to achieve effective cooperation during the frenotomy. Under aseptic condition, the procedure was performed with bilateral lingual nerve infiltration on floor of mouth using 2% lidocaine containing 1:200,000 adrenaline. The tongue tip was retracted with a 3-0 black silk suture (Figure 2a). Electrocautery needle tip was used to release muscle fibers and excise the restrictive lingual frenulum (Figure 2b). Hemostasis was effectively achieved intraoperatively without the need for sutures (Figure 2c). Postoperative observation showed improved tongue protrusion and mobility (Figure 2d). The patient was prescribed analgesic [syrup paracetamol 5ml (250mg/5ml) three time a day] for 3 days, and after that if pain persists. Postoperative instructions included regular tongue exercises (protrusion, elevation, and lateral movements) to promote healing and prevent reattachment.⁶ At the one-week post-treatment visit, clinical assessment revealed significantly

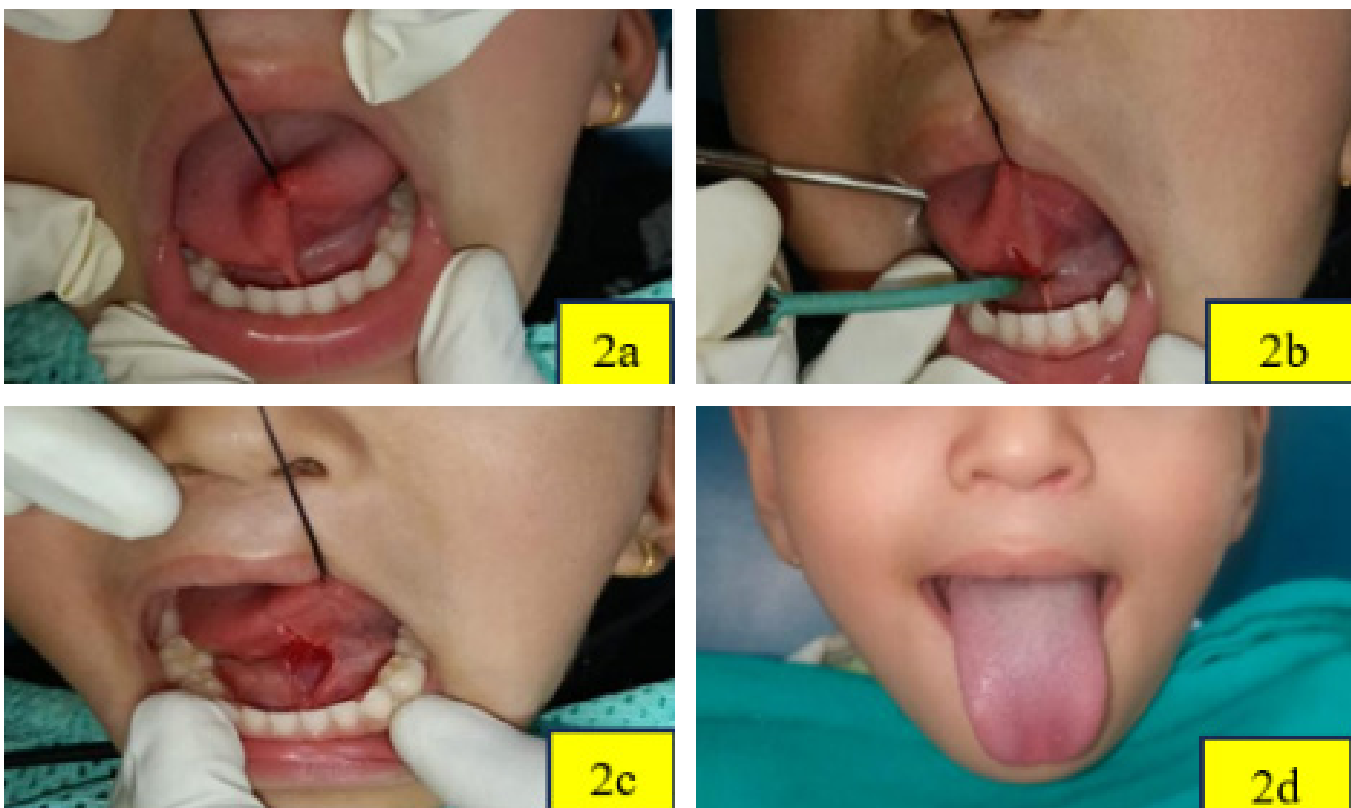


Figure 2: Management of lingual frenectomy. (2a) Traction of the tongue, (2b) Removing the muscle fibers using electrocautery, (2c) Hemostatis achieved, (2d) Immediate post-operative tongue protrusion.

improved tongue mobility and speech articulation with satisfactory wound healing.

The child was reviewed regularly for six months. Postoperative healing was uneventful, with no recurrence of frenal attachment. Tongue mobility remained unrestricted, and speech showed marked improvement. Both the patient and his parents expressed satisfaction with the outcome.

DISCUSSION

Ankyloglossia results from incomplete cellular degeneration during embryogenesis, leading to persistence of the lingual frenulum.³ Literature reports the prevalence of ankyloglossia to be higher in neonates (1.72–10.7%) than in children, adolescents, or adults (0.1–2.08%).³ Speech impairment is one of the most common presenting complaints in older children. While tongue-tie does not prevent the onset of speech, it affects articulation by restricting tongue elevation and protrusion, leading to difficulty pronouncing sounds such as “t,” “d,” “l,” “th,” and “s”.^{6,7} According to study by Meissner, 71% of young children with ankyloglossia exhibited speech abnormalities due to limited tongue mobility.⁶ In the present case also, the patient could speak but was unable to pronounce words starting with these letters.

Based on the distance of the insertion of the lingual frenulum to the tip of the tongue, tongue-tie is classified from Class I to Class IV according to Kotlow’s assessment (Table 1).³ In the present case, patient’s 8.5 mm free tongue length corresponded to Class II, indicated for surgical release due to functional limitations.

Management of ankyloglossia depends upon severity, symptoms, and age.¹ Frenotomy is a simple incision of the frenulum which consists of the surgical release of the abnormal lingual frenulum to free the tongue’s movements.⁴ Conventional approach by scissors or scalpel is cost-effective, but can cause significant intraoperative bleeding, postoperative pain, need for sutures, and overall higher patient discomfort.⁴ Laser frenotomy is

precise with controlled hemostasis, less painful, but expensive and requires specialized equipment, and training.¹⁰ Electrocautery, a thermal technique uses electrical current to cut and coagulate tissue simultaneously. Electrocautery provides excellent hemostasis, minimal bleeding, no sutures, reduced operative time, sterilization of wound, and reduced postoperative edema making it preferred choice for pediatric patients.^{9,10} In this case, frenotomy was performed with electrocautery. A key finding in this case aligns with Krishnamurthy’s observation that electrocautery results in less collateral tissue damage compared to laser frenotomy which likely contributed to the absence of complications such as swelling or reattachment during the follow-up period.¹⁰ Although electrocautery presents challenges such as foul odor, risk of bone damage, these can be managed with skilled manpower and precise technique.⁹ Importantly, adherence to the postoperative tongue exercises enhances healing, reduces recurrence, and supports functional outcomes such as speech and swallowing.^{6,7} Postoperative follow-up after one week demonstrated uneventful healing with absence of edema or reattachment, and progressive improvement in tongue mobility and speech articulation. Both patient and parents were satisfied with the treatment.

SUMMARY

Early diagnosis and individualized treatment planning based on age, symptoms, and tongue mobility are keys to the effective management of tongue-tie. The present case of a four-year-old male with Class II ankyloglossia supported the fact that restricted tongue mobility can impair articulation. Electrocautery-assisted frenotomy was chosen in this case of moderate ankyloglossia because it provides a precise, minimally invasive approach with excellent visibility, and controlled hemostasis. This eliminates the need for sutures, reduces operative time and postoperative discomfort, and promotes faster healing with significant improvement in speech articulation.¹⁰ With proper postoperative care, including tongue exercises and speech therapy, electrocautery-assisted frenotomy

offers lasting functional improvement and patient satisfaction.⁷ This case thus highlights that the small surgical intervention, when executed with precision, can significantly enhance the quality of life of young patients with tongue-tie.

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CONFLICT OF INTEREST: None



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