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Laser-Assisted Surgical Management Of Recurrent Ankyloglossia Following Lingual Frenectomy In An Adult Patient: A Case Report

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Abstract
Background*: Ankyloglossia, or tongue-tie, is a congenital anomaly characterized by an abnormally short lingual frenulum that restricts tongue mobility. Various surgical techniques have been described for its management, with diode laser-assisted frenectomy considered a reliable and minimally invasive approach. However, recurrence of tongue-tie following surgical release is uncommon and seldom reported in adults.*
Case Report*: This report presents a 22-year-old male patient with class III ankyloglossia (Kotlow's classification), who initially underwent diode laser-assisted frenectomy. Although postoperative improvement in tongue mobility and speech was noted, the patient reported recurrence of restricted tongue movements and speech difficulty after 8 months, likely due to poor compliance with postoperative tongue exercises and irregular follow-up. Clinical examination revealed a thick, fibrotic frenum with residual restriction corresponding to class II ankyloglossia. A repeat diode laser frenectomy was performed, followed by structured postoperative care, resulting in improved tongue mobility, speech, and oral hygiene during follow-up.*
Conclusion: *Management of recurrent ankyloglossia presents a clinical challenge in adult patients. With early recognition and timely intervention, patient compliance with appropriate postoperative exercises and regular follow-ups are crucial in ensuring long-term treatment success.*
Keywords: *Ankyloglossia, Tongue-Tie, Frenectomy, Diode Laser*

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I. Introduction

Ankyloglossia, derived from the Greek words *"ankylos"* (tied) and *"glossa"* (tongue), is a congenital condition of the tongue in which the lingual frenulum is abnormally short. This anomaly restricts tongue mobility, presenting either as partial ankyloglossia, where tongue movements are limited, or as total ankyloglossia, where the tongue is fused to the floor of the mouth [1].

The reported prevalence of ankyloglossia varies between 0.1% and 10.7%. It appears to occur more frequently in males, while no racial predilection has been noted [2]. While it is most commonly diagnosed in infancy due to issues with breastfeeding, such as poor latch, prolonged feeding times, and maternal nipple pain, the functional impact of ankyloglossia may extend beyond infancy into childhood and adulthood, affecting speech articulation, oral hygiene, swallowing, and social interaction [3].

The functional limitations imposed by a restricted lingual frenulum depend on its degree of severity. It can be speculated that some milder forms of ankyloglossia may resolve with growth, explaining this age-related difference. There is some evidence that ankyloglossia can be a genetically transmissible pathology [4].

Several classification systems have been proposed to categorize the severity of ankyloglossia. One widely used system is the Kotlow's classification (1999), which is based on the "free tongue" length (the distance from the insertion of the lingual frenulum to the tip of the tongue) [5] as follows:

- 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

Several techniques have been proposed for the management of ankyloglossia, including conventional frenectomy, Z-plasty, electrocautery, and laser-assisted procedures [6]. Although ankyloglossia release is generally considered effective, recurrence remains a recognized concern. Reported rates of recurrence vary considerably in the literature, ranging from as low as 0.003% to as high as 13%, depending on factors such as the definition used, the patient's age, and the surgical technique employed [7]. This report presents an unusual case of early recurrence of ankyloglossia in an adult patient, managed successfully with diode laser-assisted frenectomy.

II. Case Presentation

A 22-year-old male systemically healthy male patient presented with the complaint of difficulty in speech and history of speech problems and restricted tongue movements since birth. Intraoral examination revealed restricted tongue movements, bifid appearance of the tip of the tongue during protrusion and free tongue length of approximately 5 mm (Fig. 1) falling into category of class III severe ankyloglossia (Kotlow's classification), poor oral hygiene particularly in the mandibular lingual anterior region with short and thick lingual frenum. Supragingival and subgingival scaling and root planing were performed followed by lingual frenectomy using diode laser (Fig. 2).

Following the surgical procedure, the patient was given appropriate post-operative instructions. However, he did not comply with the consistent adherence to follow up and post-operative tongue exercises and reported directly after a period of 8 months with recurrent complaint of restricted tongue movement and speech difficulty. Post-operatively, the patient reported improvement in tongue movements initially, but after a period of 6-8 weeks, symptoms of restricted tongue movement and speech difficulty gradually recurred.

Intraoral examination revealed restricted tongue movements, with free tongue length of 9mm which had increased from baseline and now falling into class II ankyloglossia (Kotlow's classification) (Fig. 3) with short and thick lingual frenum. Even though the free tongue length had increased, patient still complained of difficulty in tongue movements and speech. The clinical appearance of the frenum post initial frenectomy was thick and fibrotic (Fig. 4).

Based on the clinical finding, diagnosis of recurrent ankyloglossia was made, and laser-assisted surgical treatment was planned following scaling and root planing.

The surgical area was anesthetized using 2% lignocaine with 1:80,000 adrenaline. Lingual frenulum was held with the hemostat at the depth of vestibule (Fig. 5). With optimal settings on the 810 nm GaAlAs diode laser (Picasso, AMD laser, Indianapolis, USA, Dentsply, International Co.) with a 400µm tip at a power setting of 1.8 W, two incisions were placed along superior and inferior aspects of hemostat with laser tip using gentle strokes.

The frenulum was then removed, leaving a diamond-shaped wound. Fiber remnants were excised and a blunt dissection was performed. The ablated tissue was continuously mopped using wet gauze piece to take care of the charred tissue and prevent excessive thermal damage to underlying soft tissue; the attachment of frenum to the alveolar ridge was also excised to prevent tension on the gingiva. Immediate post-operative view showed arrested bleeding (Fig. 6). The wound margins were approximated with 3 interrupted 3-0 silk sutures (Fig. 7).

The range of tongue motions including protrusive and lateral tongue movements were checked. Analgesics (ibuprofen 400 mg), 0.2% chlorhexidine mouthwash and warm saline rinses were prescribed. Patient was also instructed to strictly perform tongue exercises for atleast three weeks post-operatively.

One-week postoperative view showed presence of slough in the operated site indicating healing process (Fig. 8).

Clinically, complete healing along with increased range of tongue movements was observed after 1- and 3-months follow-up (Figs.11, 12, 13, 14). Oral hygiene maintenance in relation to lingual aspects of mandibular anterior teeth was remarkably improved along with improvement in speech.

Fig. 1: Free tongue length at baseline

Fig. 2: Post initial lingual frenectomy

Fig. 3: Free tongue length 8 months post initial lingual frenectomy

Fig. 4: Thick and fibrotic appearance of frenum 8 months post initial lingual frenectomy

Fig. 5: Use of haemostat to engage the lingual frenum

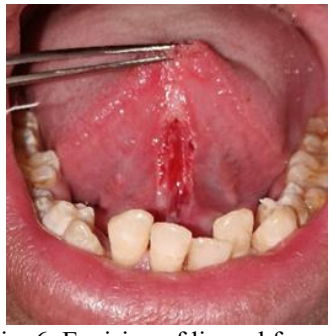

Fig. 6: Excision of lingual frenum

Fig. 7: Placement of interrupted sutures

Fig. 8: One week post-operative view showing presence of slough

Figs. 9&10: Protrusive and lateral tongue moments at baseline

Figs.11&12: Protrusive and lateral tongue moments at 1 month

Figs. 13&14: Protrusive and lateral tongue moments at 3 months

III. Discussion

Ankyloglossia is a developmental anomaly of the oral cavity, defined by an abnormal attachment of the lingual frenulum, which may restrict tongue mobility by tethering the mucosa, underlying dense connective tissue, and, in some cases, the superior fibers of the genioglossus muscle [8]. Several diagnostic criteria have been proposed for identifying ankyloglossia. These include the appearance of the tongue upon elevation, elasticity of the frenulum, length of the lingual frenulum when the tongue is raised, site of frenulum attachment on the tongue, site of attachment on the inferior alveolar ridge, as well as assessment of tongue lateralization and elevation [9].

The management of ankyloglossia involves timely and appropriate surgical intervention, complemented by speech therapy. Surgical correction may be performed at any age, depending on the patient's history and the presence of speech, functional, or social difficulties [10]. However, correction at an early age reduces the risk of latent complications.

The principal conventional surgical techniques described in the literature for managing ankyloglossia include frenotomy, which involves partial excision of the lingual frenulum; frenectomy, which involves complete removal of the lingual frenum; and frenuloplasty, which encompasses various surgical approaches aimed at releasing the tongue and reconstructing the associated anatomical structures [9].

Frenectomy is considered a more invasive surgical approach, performed under local anaesthesia, and involves complete excision of the lingual frenulum, including its insertion at the base of the mandibular bone. In contrast, less invasive procedures such as frenotomy, which only partially release the frenulum, may be associated with higher relapse rates due to the possibility of multiple frenulum insertions [3, 11].

In the present case, the first-choice treatment was frenectomy, but even then, the patient returned after 8 months with problems associated with phonation and speech difficulties indicating the need for new surgical intervention. During the healing process, fibrous tissue formation is considered a normal response; however, excessive fibrosis may lead to contraction, thereby restricting tongue mobility. Additionally, scar tissue can adhere to adjacent structures, resulting in reattachment and a recurrence of functional limitations [12]. It could be suggested that the relapse observed in the present case could be related to patients' non-compliance towards tongue movement exercises following surgery, resulting in the formation of a scar tissue that is more fibrous than normally observed. In older individuals, reduced tissue plasticity and a less efficient healing capacity may predispose to increased fibrotic response, thereby elevating the risk of postoperative restriction [11].

To minimize the risk of recurrence following frenectomy, patients are advised to undergo myofunctional tongue rehabilitation exercises under the guidance of a speech therapist, a practice that has been shown to enhance treatment outcomes in numerous reported cases [13]. Amant et al [12] suggested that the myofunctional rehabilitation should begin one week before surgery so that the patient learns to perform the praxis of the treatment without pain. Dolghier et al [14] reported that in the absence of postoperative stretching, massage, or functional therapy, the healing tissues may contract or adhere abnormally, leading to restricted tongue mobility. Structured rehabilitation is therefore essential to preserve functional range of motion and to guide the tissue into a more favorable healing pattern. Furthermore, the presence of infection or inflammation during healing may increase scarring, delayed healing, which may lead to formation of restrictive fibrotic tissue or adhesion across healing surfaces [3,6].

The use of laser in the present case provided a cleaner and more precise incisions, facilitate excellent hemostasis through simultaneous coagulation, and minimize intraoperative bleeding, thereby improving visualization of the surgical field. In addition, lasers offer tissue sterilization, shorten operative time, and cause less postoperative discomfort, swelling, and risk of infection. The reduced collateral tissue damage also promotes better healing with minimal scar formation, which could potentially lower the risk of recurrence [15].

Lack of adequate postoperative follow-up may result in missed early signs of reattachment or restriction. Early intervention (stretching, minor release) may avert full recurrence, but if follow up is lax, restrictions may persist or worsen [9], which could be one of the main reasons for early recurrence in the present case.

To achieve optimal postoperative outcomes, structured tongue training, strict follow up and speech therapy are essential. Tsaousoglou et al [9] have recommended a series of tongue exercises following surgical release, including: protruding and retracting the tongue, opening the mouth widely and attempting to touch the tip of the tongue to the posterior maxillary teeth, moving the tongue laterally from one side of the mouth to the other without jaw movement, transferring food boluses across the oral cavity using only the tongue, and practicing articulation of consonant sounds such as "f," "v," "d," "n," "l," "sh," "s," "zh," "r," and "z." In the present case, the patient was advised to undergo tongue-training immediately after surgery and continue for 3 to 4 weeks postoperatively. Thereafter, the patient was evaluated for one month and 3 months postoperative follow up and a considerable improvement in tongue movements and speech was observed. Further regular follow-ups were recommended.

IV. Conclusion

Recurrent ankyloglossia, though uncommon, presents a clinical challenge that underscores the importance of meticulous surgical technique, comprehensive postoperative care, and structured myofunctional rehabilitation. This case highlights that incomplete release, fibrotic healing, or inadequate follow-up can contribute to recurrence, thereby reinforcing the need for individualized treatment planning. Early recognition and timely intervention not only improve functional outcomes but also minimize the risk of relapse, ensuring long-term stability and enhanced quality of life for the patient.

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