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Untying the Tongue: A Case Series on Pediatric Lingual Frenectomy

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Abstract:
Background: Ankyloglossia, or tongue-tie, is a congenital condition where a restrictive lingual frenulum affects speech, feeding, and oral hygiene in children. Early surgical correction with post-operative exercises can significantly improve outcomes.
Aim: To present two pediatric cases of ankyloglossia managed using different frenectomy techniques and compare their clinical outcomes.
Summary: A 7-year-old with mild ankyloglossia underwent conventional scalpel frenectomy, while a 6-year-old with moderate ankyloglossia was treated using a diode laser. Both received post-operative myofunctional therapy.
Results: Healing was smooth in both cases. Notable improvements in tongue mobility and pronunciation were observed after four weeks. The scalpel method ensured complete fiber release, while the laser technique offered enhanced comfort and minimal bleeding.
Conclusion: Both surgical approaches are effective for treating ankyloglossia in children. Technique selection should consider patient comfort, clinical findings, and surgeon expertise.

Keywords: Ankyloglossia, tongue-tie, pediatric frenectomy, laser surgery, myofunctional therapy

Introduction:

During the fourth week of gestation, the two lateral lingual swellings travel medially to combine with the tuberculum impar which leads to the formation of the anterior two- thirds of the tongue and the lingual frenulum. Separation of the tongue from the floor of mouth leads to formation of lingual sulcus. The failure of this process leads to formation of tongue tie or more commonly known as Ankyloglossia (AG).[1] Ankyloglossia is a congenital disorder in which the lingual frenum is abnormally short, thickened and tight.[2]

The length of the free tongue, the lingual frenulum attachments to the tongue, to the floor of the mouth, and to the inferior alveolar ridge, as well as the tongue's appearance such as shape, position, and function in both relaxed and moving states, should all be evaluated during the oral cavity examination of a Pediatric patient. The attachment of lingual frenulum is generally 1cm behind the tip of tongue.[3] The most common feature of tongue tie is the appearance of heart-shaped tongue on protrusion.[4]

According to Kotlow, Ankyloglossia can be classified into 4 classes based on attachment of lingual frenum to the tip of tongue which is normally 16mm as, Class I: Mild: 12 to 16mm, Class II: Moderate: 8 to 11mm, Class III: Severe: 3 to 7mm, Class IV: Complete: less than 3mm.[5]

Due to reduced tongue mobility, the natural function of tongue of self-cleansing and maintaining oral hygiene is hampered. Atypical swallowing patterns were also seen.[6] In school-age children (6-12years), the most common problem encountered is the defective pronunciation of dento-lingual-labial phonemes such as omission and substitution of /r/, and consonant clusters with /r/, and of /s/ and /z/. Frontal and lateral lisps also occurred.[7]

The most common treatment modality of Ankyloglossia is lingual frenectomy followed by myofunctional exercises. Here, we are discussing two cases of lingual frenectomy of 7year old male patient who was treated with conventional surgical approach and other patient being a 6year old male who was treated with laser frenectomy.

Case Presentation:

Case 1:

A 7year old male patient reported to the Department of Pediatric and Preventive Dentistry with difficulty in speech. The patient had no relevant medical history or family history. There was no known allergy of any food or medications. Extraoral examination was normal. On intraoral examination, a short thick lingual frenum was observed with characteristic heart-shaped tongue. According to Kotlow, Ankyloglossia was classified as Class I: Mild i.e. 12 to 16mm attachment of lingual frenum to the tip of tongue. Informed consent was obtained. Betadine was used for extraoral antisepsis. Topical anaesthesia was applied to the underside of the tongue followed by bilateral lingual nerve blocks along with local infiltration with 2% Lignocaine with 1:80,000 epinephrine. Tongue traction was done using 3-0 silk suture being tied at the tongue tip. The frenulum was secured with a small curved hemostat that faced the ventral surface of the tongue with a convex curvature. The first cut was made with a #15 blade, following the curvature of the hemostat and passing through the upper portion of the frenulum. Along the hemostat's lower curve, which was toward the floor of the mouth, the second incision was made. A diamond-shaped wound was formed after complete excision of the frenulum. Muscle fibres were broken when blunt-ended dissecting scissors were used to undercut the edges of the wound. By inserting the first absorbable 4-0 vicryl suture in the centre of the wound, tension-free closure was verified. Further 3 extra sutures were positioned on the floor of the mouth and at the base of the tongue. Follow up done after 7days for checking of wound healing.

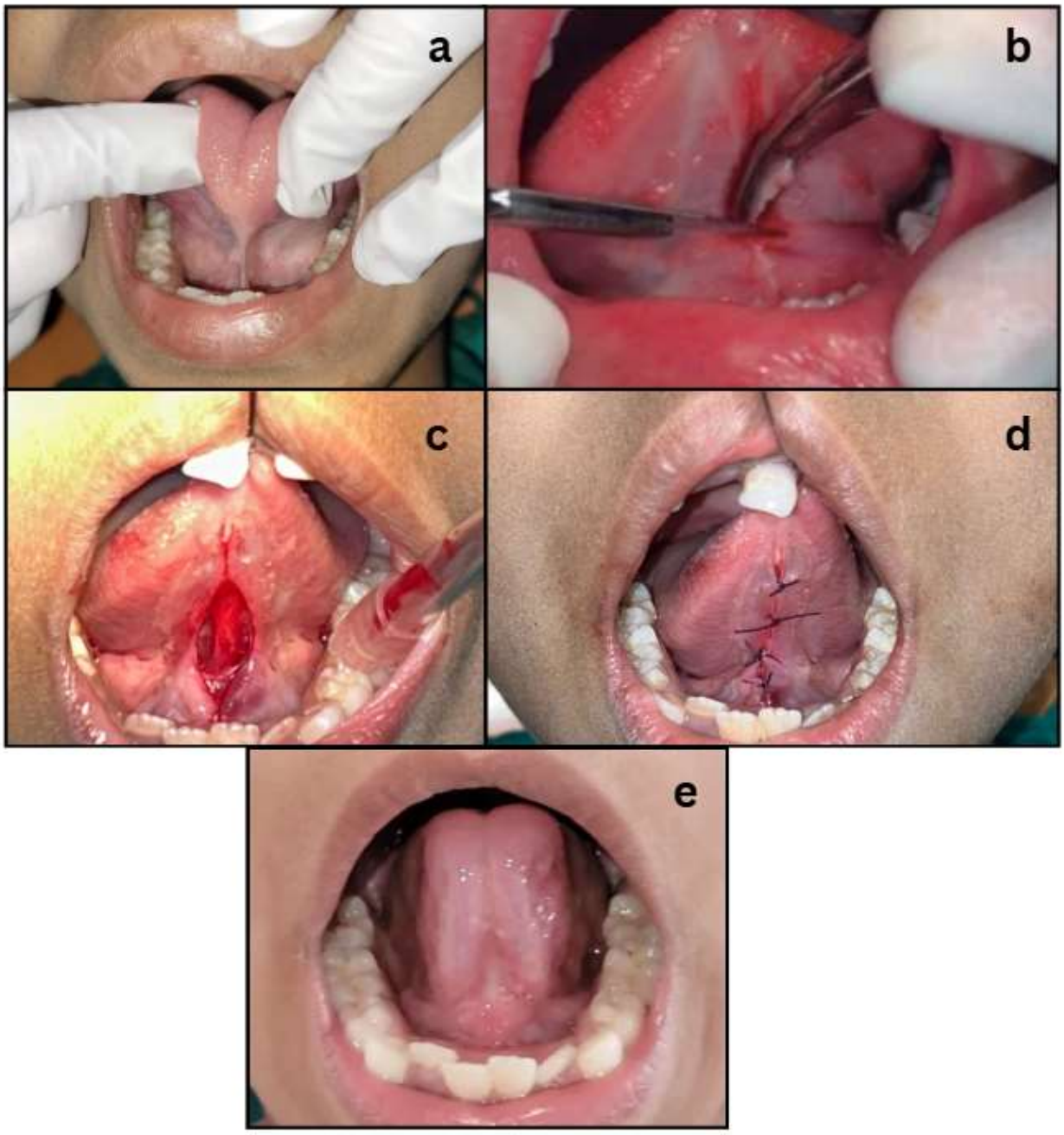

Figure 1 Case 1: a) Intraoral examination b) Frenum held with a curved hemostat c) Diamond shaped defect after frenectomy d) Suturing with 4-0 vicryl sutures e) Healing after 2weeks

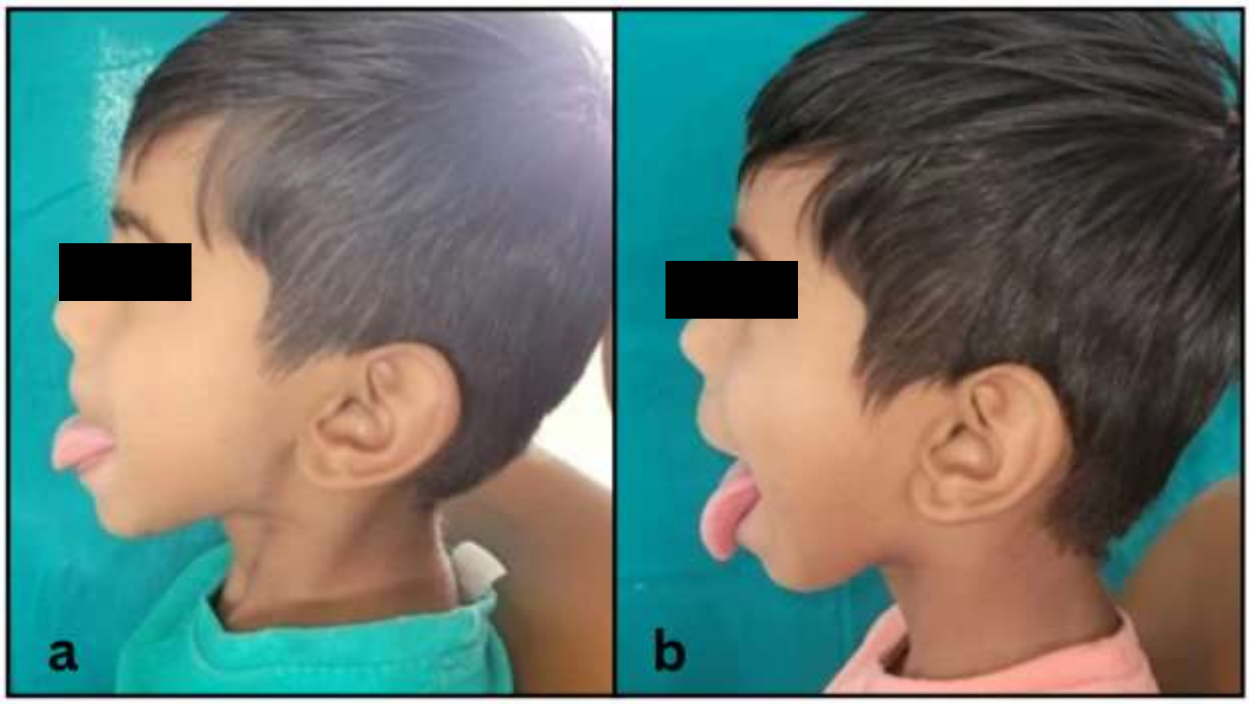

Figure 2 Case 1: a) pre-operative tongue protrusion b) post-operative tongue protrusion

Case 2:

A 6year old male patient reported to the Department of Pediatric and Preventive Dentistry with a complaint of toothache. During the dental treatment it was noticed that, the patient had a peculiar heart shaped tongue along with some speech difficulties. It was diagnosed as tongue tie. The parents were informed about condition and educated about the procedure. The patient had no relevant medical history or family history. There was no known allergy of any food or medications. Extraoral examination was normal. According to Kotlow, Ankyloglossia was classified as Class II: Moderate: 8 to 11mm attachment of lingual frenum to the tip of tongue. Informed consent was obtained. Betadine was used for extraoral antisepsis. Topical anaesthesia was applied to the underside of the tongue followed by bilateral lingual nerve blocks along with local infiltration with 2% Lignocaine with 1:80,000 epinephrine. The frenulum incision was carried out with Biolase Epic X Diode laser at a wavelength of 940nm and power of 1.5 to 4 W in contact mode, which was applied continuously to the central area of the frenulum from the tip to the base of the tongue till the frenum along with muscle fibres were relieved. A diamond shaped wound was seen at the end of procedure.

In both the cases, post-operative surgical instructions were given. Patients were prescribed analgesics (Syp Ibuprofen, 10 mg/kg/dose) in case of pain. Follow-up was scheduled after a week. Wound healing was uneventful and satisfactory. During the follow-up visit, patient was taught tongue exercises and was asked to perform them three times a day for four weeks. After four weeks, patients' tongue movement had significantly improved, and they could now more easily and confidently pronounce syllables that contained the r, s, z, ch, and zh sounds.

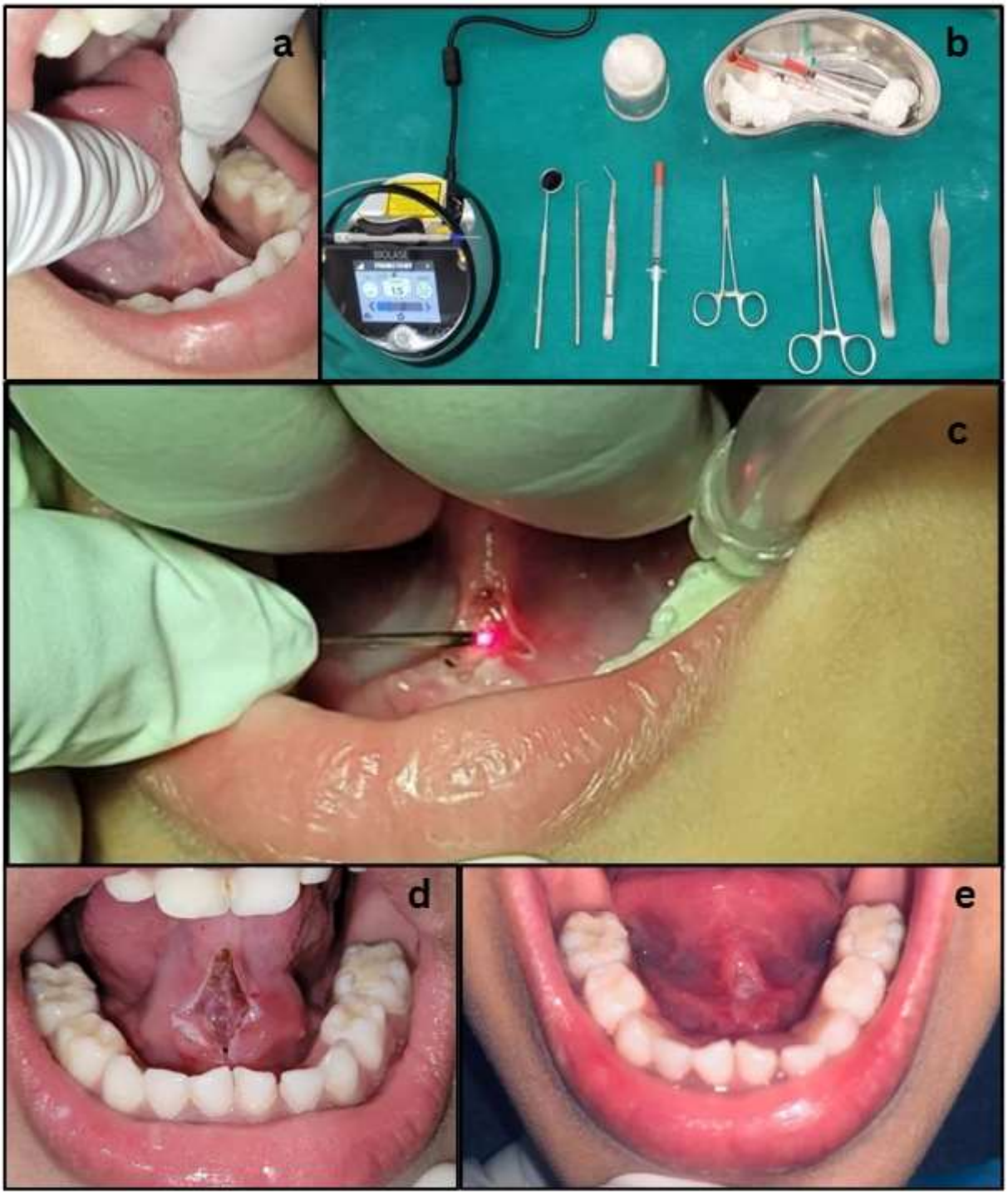

Figure 3 Case 2: a) Intraoral examination b) Armamentarium for laser frenectomy c) Excision of lingual frenum with diode laser d) Diamond shaped defect after frenectomy e) Healing after 2weeks

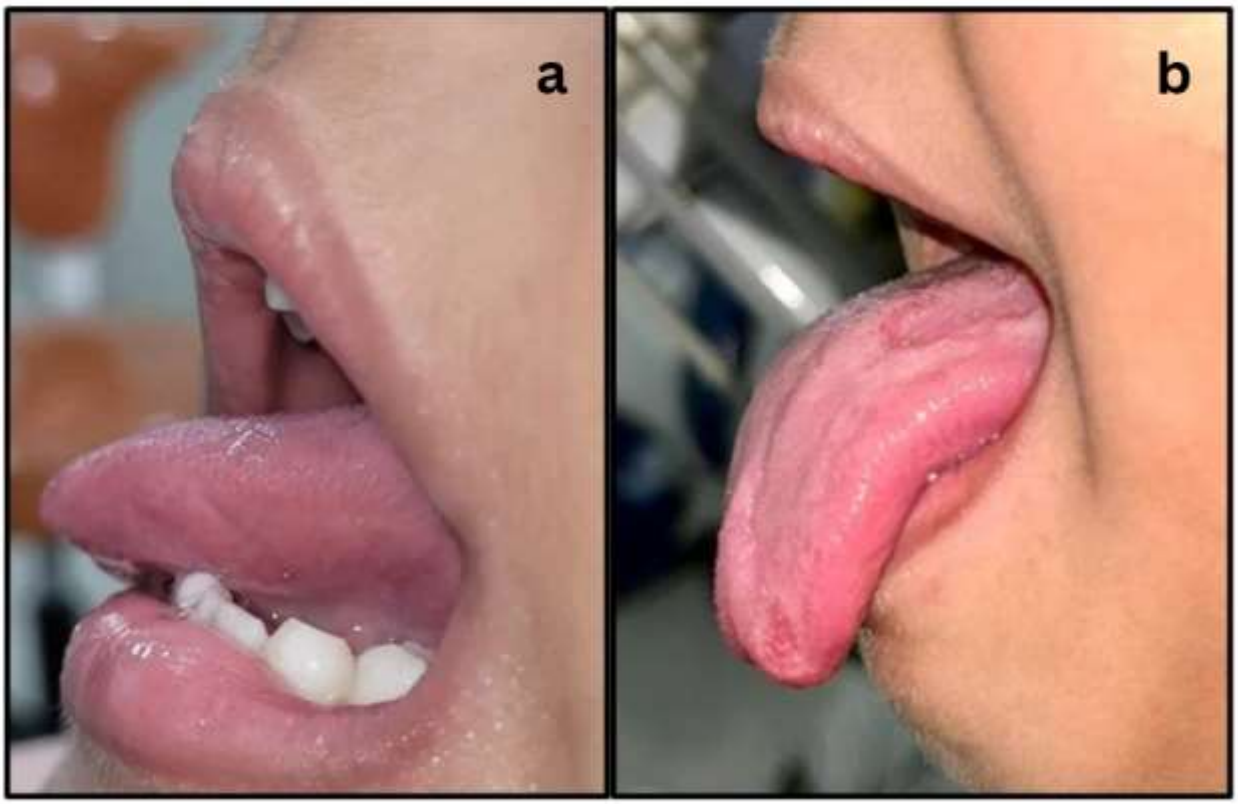

Figure 4 Case 2: a) pre-operative tongue protrusion b) post-operative tongue protrusion

Discussion:

The term Ankyloglossia is derived from Greek words – "agkilos" (curved), "glossa" (tongue). The exact etiology of Ankyloglossia is unknown. It maybe sometimes associated with few syndromes such as Beckwith – Wiedemann syndrome, Simosa syndrome, Ehler Danlos syndrome, Van der Woude syndrome, X-linked cleft palate. Maternal cocaine use has been shown to increase the risk of Ankyloglossia almost three times.[8]

Early surgical management of tongue-tie, when combined with myofunctional therapy, serves as an effective preventive approach. This combination often yields favourable outcomes in a shorter duration than anticipated. Ankyloglossia can be surgically corrected using various techniques, including electrocautery, laser, and the conventional single or double hemostat method.[9]

The time frame of healing is different for every tissue based on its nature and function. Healing by primary intention is seen in conventional hemostat surgery due to the wound being closed by vicryl sutures. Whereas laser-assisted frenectomy recovered by secondary intention leading to formation of a scar.10

One of the key advantages of the traditional single hemostat technique is its ability to ensure complete removal of the frenum's muscle fibres, making the scalpel a preferred method over other options. However, careful attention is required during the procedure to avoid damage to nearby vital structures such as the salivary glands and to reduce the risk of complications like numbness or paraesthesia affecting the tongue and surrounding soft tissues.[2,11]

The main virtues of laser over the other two techniques, include reduced pain sensation, less bleeding resulting in a clear surgical field, and patient comfort. Additionally, the patient and parents view the laser as a magical and less intrusive tool, which makes it more acceptable and well-tolerated. The only disadvantage of laser is that it is not cost effective.[7]

Conclusion:

Timely management of tongue-tie is important to enhance a child's self-esteem in both social and public settings. Treatment should be approached through a multidisciplinary lens, with emphasis on appropriate postoperative care. Regular follow-up appointments are essential to monitor healing and ensure the correct execution of myofunctional therapy.

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