Ankyloglossia as an oral functional problem and its surgical management

Zrost języka z dnem jamy ustnej jako wada czynnościowa i jej leczenie chirurgiczne

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Abstract

Tongue-tie or ankyloglossia is a developmental anomaly of the tongue characterized by an abnormally short, thick lingual frenulum resulting in limited tongue movement. Ankyloglossia can affect feeding, speech and oral hygiene, as well as have mechanical and social effects. Diagnosis of tongue-tie is based on a clinical examination. Tongue mobility and appearance associated with the insertion, as well as the attachment and the shortness of the lingual frenulum should be evaluated. Ankyloglossia management should be considered at any age considering the risk-benefit evaluation and because of the highest vascularization and mobility of tongue; lingual frenectomy should be performed with less traumatic events to avoid postoperative complications.

The aim of this article is to report 2 cases of ankyloglossia in young patients who were referred to the Department of Oral Surgery of the Faculty of Dentistry at the Mohamed V University of Rabat, Morocco. According to Kotlow's classification, both patients were diagnosed with Class II and treated with surgical frenectomy, followed by speech therapy for an immediate rehabilitation. A marked improvement in the movement of the tongue was observed at a follow-up visits in the treated cases.

Key words: ankyloglossia, tongue-tie, lingual frenectomy

Słowa kluczowe: zrost języka, skrócenie wędzidełka języka, wycięcie wędzidełka

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Ankyloglossia, also known as tongue-tie, is a congenital oral anomaly characterized by an abnormally short lingual frenulum, in which the tip of the tongue cannot protrude beyond the lower incisor teeth.¹ This anatomic condition may have an impact on tongue function and it can also interfere with the shape of the dental arches and their consequent occlusion.² In the literature, such a condition occurs in 0.02–10.7% of neonates, and males seem to be more affected than female patients in a proportion ranging from 4:1 to 1.7:1.³ Tongue-tie is often an isolated anomaly, but its association with other craniofacial abnormalities might be possible.¹

There is a continuous controversy over the diagnostic criteria and treatment of ankyloglossia.^{2,3} Diagnostic criteria established by several studies are based on the length of the lingual frenulum, amplitude of tongue movement, heart-shaped look when the tongue is protruded, and thickness of the fibrous membrane.^{4,5} In children, ankyloglossia can lead to difficulty in breastfeeding, pronunciation disorders, unsatisfactory oral hygiene, bullying during childhood and adolescence, as well as difficulties in sucking or ice-cream licking, kissing and playing wind musical instruments.^{2,6}

The aim of the present article is to describe 2 clinical cases of ankyloglossia and their successful surgical management with lingual frenectomy, followed by speech therapy for an immediate rehabilitation of the lingual muscles; also, a short literature review is presented.

Case reports

Case 1

A healthy 15-year-old girl was referred to the Department of Oral Surgery by her orthodontist to undergo a frenectomy due to the restriction of tongue movements and functions. The patient followed her treatment in the orthodontic department for hyperdivergent Class III malocclusion (Kotlow's classification). Results of general physical examination were normal. The intraoral examination revealed that she could protrude the tongue only to the lower lip and not beyond. The ankyloglossia was classified as Class II using Kotlow's classification (Fig. 1A).

Case 2

A healthy 13-year-old boy reported a complaint of restricted tongue movement and speech difficulties; he was neither able to utter letter sounds "l," "t," "d," "n," "s," and "th" distinctly nor to protrude his tongue over the vermilion border of lower and upper lip. The patient followed his orthodontic management of a Class III malocclusion and was referred to the surgery department for a lingual frenectomy to optimize the pursuit of treatment. Clinical intraoral examination showed the presence of a Kotlow's

Fig. 1. Preoperative view showing ankyloglossia (A – case 1, B – case 2)

Class II ankyloglossia and there was neither a malocclusion nor a recession present in lingual of the mandibular incisors (Fig. 1B).

Surgical procedure

After a general assessment of both patients, informed consent from their legal guardians was obtained and lingual frenectomy was indicated.

The frenectomy was performed with a scalpel using blade No. 15. Local anesthesia infiltration was deposited bilaterally at the base of the tongue, floor of the mouth and toward the genial tubercle on the lingual aspect of the mandible. The frenulum was maintained with a curved hemostat by inserting the convex curve at the depth of the vestibule, and then clamped into position, followed by 2 incisions at the superior and inferior aspect of the hemostat. The frenulum was then removed, leaving a diamond-shaped wound (Fig. 2). Fiber remnants were excised and a blunt dissection was performed to achieve a good tension-free closure of the wound edges, and 4-0 non-absorbable silk sutures were placed over the wound (Fig. 3).

The postoperative period was uneventful with no hemorrhage complications. Sutures were removed after 1 week with no scar tissue formation and the patients were sent to speech therapy sessions. Both patients had a 3-months postoperative follow-up in which no recurrence nor difficulties in lingual functions were reported, which suggests an excellent prognosis for the 2 cases (Fig. 4, 5).

Fig. 2. Incision of the frenulum (A – case 1, B – case 2). The excised triangular tissue was held with the hemostats and excision of fiber remnants

Fig. 3. Silk sutures placed over the wound (A – case 1, B – case 2)

Fig. 4. Postoperative view 3 months after the surgery (A – case 1, B – case 2)

Fig. 5. Postoperative view at 3 months showing easy lingual propulsion (A – case 1, B – case 2)

Discussion

Ankyloglossia is a Greek term which means “agkilos” for curved and “glossa” for tongue and is more commonly called “tongue-tie”. It is a congenital anatomical variation characterized by a short lingual frenulum, which may result in the restriction of tongue movement and can thus impact oral functions.^{3,4}

During the 4th week of gestation, the tongue’s origin is from the 1st, 2nd and 3rd pharyngeal arches. In this period, grooves are formed laterally to the structure and it can move freely, except for the region adhered by the lingual frenulum, initially at the apex of the tongue. As the development occurs, the frenulum cells undergo apoptosis and they tend to migrate distally to the medial region of the lingual dorsum, which explains the possible interferences

in cell control and the incomplete migration, or even its non-occurrence resulting in an ankyloglossia.⁷ In most cases, ankyloglossia is seen as an isolated finding in children. However, several syndromes are associated with this physical finding, including Ehlers-Danlos syndrome, Beckwith-Wiedemann syndrome, Simosa syndrome, X-linked cleft palate, and orofaciogigital syndrome.^{1,3,6}

Ankyloglossia might be a result of a possible manifestation of mutations in T-box genes or of exposure to teratogenic substances during pregnancy.^{2,3} Diagnosis is based on a clinical examination. Tongue mobility and appearance associated with the insertion, as well as the attachment and the shortness of the lingual frenulum, should be evaluated. Furthermore, instances of speech difficulty resulting from the limited tongue movements can be checked by vocalizing some letters and words (sounds such as “t”, “d”, “r”, “n”, and “l”, and words like “ta”, “te”, time, water, cat, etc.).^{3,6}

Kotlow classified the ankyloglossia into 4 classes:

- 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 (less than 3 mm).⁸

Several publications have investigated the influence of the tongue and lingual frenulum on maxillofacial anomalies such as mandibular prognathism, maxillary protrusion and anterior open bite. Yoon et al. showed in their recent cross-sectional cohort study that the restriction of tongue mobility was associated with the narrowing of the maxillary arch and the elongation of the soft palate, which may affect maxillofacial development.⁹ Generally, in the majority of published articles, this hypothesis is mainly based on single observation and speculative interpretations, and there is still limited evidence that tongue-tie represents a cofactor in the development of malocclusions, especially Class III malocclusion.^{7,9,10}

Clinicians may strive with the management of ankyloglossia after diagnosis of the condition, since there is no consensus about the optimal timing, indication and type of surgical intervention for ankyloglossia. Correct diagnosis of ankyloglossia and early intervention are imperative, since several consequences ranging from restriction of tongue movement to impairment of mandibular growth may occur.^{3,10}

Several management options exist for the treatment of tongue-tie. They include observation, speech therapy, otolaryngotherapy; frenotomy, frenectomy, Z-plasty, and laser frenectomy, and they have the capacity to deliver satisfactory results, often in a shorter time than expected. If the intervention of a speech therapist and otolaryngologist fails to resolve speech and tongue related problems, then it may be necessary to consider surgical protocol. Surgical interventions are absolutely safe at any age, including infants and adults, but strictly require postsurgical tongue reeducation and speech therapy to achieve satisfactory results.⁶

Surgical management of tongue-tie can be classified into 3 techniques:

- frenotomy defined as simple cutting of the frenulum;
- frenectomy defined as complete excision, i.e., removal of the whole frenulum;
- frenuloplasty that includes various methods to release the tongue-tie and correct the anatomic situation.

There is no sufficient evidence in the literature concerning surgical treatment options for ankyloglossia to favor any of the 3 main techniques.^{6,11}

In these clinical cases, our 2 patients with tongue-tie were subjected to surgical correction by frenectomy procedure, which is more invasive and difficult to be performed in young children, although the results are more predictable, decreasing the recurrence rate.¹² On the other hand, the use of lasers as an alternative technique in the treatment of ankyloglossia is considered safe and minimally invasive. It has an advantage over conventional treatment as it is bactericidal; it also provides a bloodless operating field and does not require sutures or anesthesia. Recurrent ankyloglossia can occur with scarring at the site of the division and the clinical manifestation is less intense than before the 1st treatment; also, recurrent ankyloglossia responds effectively to revision surgery.^{3,4}

Late postoperative complications after ankyloglossia management are rare. Various complications include bleeding, blockage of Wharton's duct while suturing on the ventral surface of the tongue leading to retention cyst, and damage to the lingual nerve causing numbness of the tongue tip.¹³ A recent systematic review conducted by Bin-Nun et al. mentioned that the yearly number of ankyloglossia-related articles has increased dramatically in the past few years without bringing interesting evidence.¹⁴ If this trend continues, much more solid evidence (randomized controlled trials and systematic reviews) should accumulate about diagnosis and management of tongue-tie, as it relates to breastfeeding and other outcomes.

Conclusions

Tongue-tie, or ankyloglossia, is a serious oral problem that affects quite a large number of infants and children. A careful clinical examination is essential for an early diagnosis of a lingual dysfunction and in order to choose optimal management, including surgical intervention or laser therapy, followed by proper tongue exercises, which leads to satisfactory results in a short time.

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