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Thumb Sucking Habit Treated with Palatal Crib and Myofunctional Therapy: A Case Report

[1]Dr. Vivek Dhruvkumar, Professor, Department of Pediatric Dentistry, Vokkaligara Sangha Dental College Bengaluru, Karnataka.

[2]Dr. Yashaswini HG, Postgraduate, Department of Pediatric Dentistry, Vokkaligara Sangha Dental College Bengaluru, Karnataka.

[3]Dr Syeda Husna Noorein, Postgraduate, Department of Pediatric Dentistry, Vokkaligara Sangha Dental College, Bengaluru, Karnataka.

[4]Dr. Suma G, Professor & HOD, Department of Pediatric Dentistry, Vokkaligara Sangha Dental College Bengaluru, Karnataka.

Corresponding Author: Dr. Yashaswini HG, Postgraduate, Department of Pediatric Dentistry, Vokkaligara Sangha Dental College Bengaluru, Karnataka.

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Abstract

Thumb-sucking is the most common oral habit and a frequently observed behavioral pattern in preschool-aged children. It plays a key role in the development of malocclusion and should be managed with care, as it can lead to a secondary tongue thrust that aggravates the condition. Creating an effective treatment plan involves identifying the root cause, which may be psychological, physiological, or anatomical in nature. Proper planning for behavior prevention is essential to achieve successful treatment outcomes. One effective appliance used to address tongue-thrusting and thumb-sucking habits is the palatal crib. This case highlights the potential benefits of using a palatal crib alongside myofunctional therapy in a child who habitually held the tongue low and engaged in thumb-sucking, both contributing to an anterior open bite (AOB). An 11-year-old male patient exhibited a flaring and spacing of both upper and lower incisors with anterior open bite. Myofunctional therapy, in conjunction with a palatal crib, was employed to facilitate proper tongue positioning and eliminate the thumb-sucking habit.

Keywords: Thumbsucking, Tongue thrusting, Platal crib, Myofunctional therapy, Malocclusion, Anterior openbite

Introduction

Habits are characterized as repetitive, involuntary behaviors that are performed consistently over time [1]. The oral cavity serves as a primary outlet for emotional

expression and self-soothing, often helping to reduce feelings of stress and anxiety in both children and adults. Stimulating the oral region whether through the tongue, fingers, or even fingernails can produce a calming and pleasurable sensation [2]. These behaviors are known to begin as early as 29 weeks of gestation and may persist across the stages of dental development, including the deciduous, mixed, and permanent dentitions. However, if such habits continue during the mixed dentition phase, they can interfere with normal orofacial growth and lead to the development of malocclusions [3].

Several factors such as unfavorable growth patterns, finger and pacifier-sucking habits, retained infantile swallowing patterns, abnormal tongue posture and function from and enlarged lymph nodes can contribute to the development of an anterior open bite. These multifactorial influences make the management and correction of such complex malocclusions particularly challenging [4].

A persistent thumb-sucking habit can lead to protrusion of the maxillary incisors, lip incompetence, disruption of the lip seal essential for normal swallowing and eventually the development of an anterior open bite[5]. Additionally, the tongue may adopt an abnormal position during swallowing or at rest, often in conjunction with thumb-sucking behavior, which can further aggravate the severity of the malocclusion[6].

The palatal crib functions by preventing the tongue from resting against the upper teeth. However, while it acts as a mechanical barrier, it may also encourage the tongue to adopt a lower resting position. This can hinder proper functional re-education of the tongue and potentially lead to recurrence of further malocclusions[7].

In such cases, myofunctional therapy becomes essential to realign and retrain the tongue to its natural resting posture. Myofunctional therapy can be viewed as a specialized form of physical therapy focused on the oral and facial musculature. It involves targeted exercises designed to improve speech, breathing, chewing, and swallowing by strengthening and coordinating the muscles of the face, tongue, and mouth.

The following case report illustrates the effectiveness of palatal crib therapy, combined with myofunctional therapy, in treating a child presenting with habitual anterior and low tongue posture along with persistent thumb-sucking behavior**.**

Case Presentation

A female patient, 9 years old, reported to SGK Dental Hospital, Bangalore with her mother with a chief complaint of thumb sucking and wants treatment for the same. The patient had no significant pre-natal history and post-natal history. A detailed medical history was obtained, during which the mother reported that the child habitually sucked her thumb for approximately 7–8 hours daily more during night. Intraoral examination revealed that the patient was in the mixed dentition stage**,** with a Class I molar relationship bilaterally. A 8 mm anterior open bite (AOB) was noted between the central incisors, extending laterally to the canines on both sides. The prolonged and intense thumb-sucking habit had resulted in an AOB accompanied by simple tongue thrusting behavior. Following a comprehensive clinical examination and detailed case history recording, further assessment was conducted to evaluate the extent of habit-related orofacial and dental changes. On Physical examination She was moderately built and nourished with Left hand thumb finger showed callus formation with reduced nail growth, on extra oral examination dolicocephalic shaped head, leptoproscopic facial form with convex profile and reduced lower facial height with potentially competent lips was observed. On Intraoral examination Maxillary arch is “V” shaped with deep

palate and apparently symmetrical and Mandibular arch is also U shaped and apparently symmetrical. class II molar relation and class I canine relation seen on both sides with Proclined upper anteriors with anterior spacing . Due to the prolonged and severe thumb-sucking, the child exhibited an AOB along with simple tongue thrusting.

A fixed habit-breaking appliance, Palatal crib was used to guide the tongue into its natural resting position and discourage the habit of thumb-sucking. In addition to this, a second strategy involved is the patient performing daily myofunctional exercises at home, under parental supervision, to retrain the tongue to maintain its normal resting posture such as Tongue-rolling exercise, Tongue retraction, Tongue-pull exercise and 4S exercise along with it Lip competency exercises were practised routinely, The patient was instructed to perform each exercise at least 10 times.

Following the banding of the primary molars, an alginate impression was taken. A crib was then fabricated on the resulting cast using 0.8 mm stainless steel wire. The joints of the crib were soldered. At the subsequent visit, the appliance was cemented in place using Type I glass ionomer cement (GIC)

The patient was recalled after two weeks, and positive feedback was reported by the Mother. At the three-month follow-up examination, a significant reduction in the habit was observed.

Following successful habit reversal, the patient was advised to continue wearing the appliance for a minimum duration of three months. Subsequent follow-up evaluations showed no evidence of relapse. To ensure long-term stability of the therapeutic outcomes, the continuation of myofunctional exercises was recommended for at least five months post-appliance removal.

Figure 1:

Figure 2:

Figure 3: Callus on left thumb

Figure 4: increased overjet of 8mm

Figure 5: tongue thrust

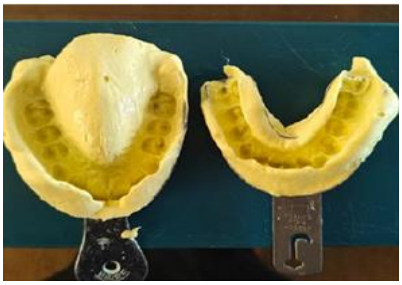

Figure 6: Alginate impression of maxillary and mandibular arches

Figure 7: Fabrication of Tongue crib appliance

Figure 8: Insertion of tongue crib appliance

Figure 9: Tongue crib appliance imtraoral view

Discussion

This case highlights the effectiveness of a palatal crib appliance in eliminating thumb-sucking habits within a relatively short period. The integration of myofunctional therapy post-appliance removal contributed significantly in maintaining a normal resting tongue posture and ensuring the long-term stability of the correction. Early intervention, combined with consistent follow-up and patient compliance, proved essential for achieving favorable and lasting outcomes.

While digit-sucking is a normal self-soothing behavior in young children, its persistence and intensity beyond the preschool years can disrupt normal dentofacial development and contribute to malocclusions. Prolonged habits may lead to malocclusions such as anterior open bite, increased overjet, maxillary constriction, and altered incisor angulations, necessitating timely intervention [8]

Thumb-sucking often leads to anterior open bite and a subsequent tongue thrust, worsening the condition. Management strategies for chronic digit-sucking include behavioral reinforcement, patient counseling, mechanical deterrents, and tactile cues. Anterior crib appliances are particularly effective, acting both as physical barriers and behavioral reminders [8].

The coexistence of thumb-sucking and tongue-thrusting in this patient underscores the importance of evaluating the broader etiological factors, which may include psychological reassurance, physiological needs, and anatomical predispositions. A tailored treatment plan that focuses on eliminating these deleterious habits is essential to achieve functional correction and long-term stability [9]

The palatal crib functions as an effective interceptive tool in the management of anterior open bite (AOB), primarily by obstructing tongue thrust and discouraging digit-sucking behaviors. Nevertheless, its sole use may not always be adequate in repositioning the tongue. As such, incorporating myofunctional therapy is advised to assist in re-educating the tongue to assume a normal resting posture, thereby improving both the effectiveness and long-term stability of the treatment outcome [9]

Smithpeter and Covell investigated the role of myofunctional therapy in sustaining the correction of

anterior open bite (AOB) following orthodontic treatment. Their findings revealed that in patients presenting with forward tongue posture and tongue thrust, the incorporation of myofunctional therapy substantially enhanced the long-term stability of AOB closure [10].

Conclusion

In the presence of an anterior open bite (AOB), it is essential to identify and address abnormal tongue posture and deleterious oral habits. Initially, the use of minimally invasive approaches such as behavioral counseling is recommended before progressing to mechanical habit-interrupting interventions. Habit-breaking appliances are particularly beneficial for children who require additional support in overcoming persistent habits. These appliances can be fixed or removable, and their use significantly reduces the risk of improper facial skeletal development and dental misalignment. One such fixed appliance is the palatal crib, which serves to discourage detrimental habits by guiding the tongue into a more physiological resting position. When used in conjunction with myofunctional therapy, the palatal crib has demonstrated effectiveness in treating AOB associated with anterior or low tongue posture and thumb-sucking. Moreover, the addition of myofunctional therapy enhances the long-term stability of the correction by promoting improved tongue control and preventing relapse.

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