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(CASE REPORT)

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Effectiveness of lip bumper appliances as a reducer of lip sucking habit in children: A case report

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Abstract

Introduction: Oral habits, like lip sucking, are prevalent in children and can impact oral health and facial aesthetics. While occasional lip sucking is normal, persistent engagement can cause dental and skeletal issues. This case report aims to highlight the potential of lip bumper appliances as a viable treatment for correcting lip sucking habits in children.

Case History: An 11-year-old boy accompanied by his mother came to the Department of Pediatric Dentistry with the chief complaint of protruding upper front teeth. His mother revealed a history of lip sucking and object biting since age 6. The patient experiences embarrassment regarding his current condition and expresses a desire for treatment. Intra oral examination showed an incompetent lip and an overjet 13 mm. The treatment plan was delivered with 3 stages of treatment, stage 1 was to correct the lip sucking habit of using a lip bumper. Stage 2 was to correct maxillary anterior protrusion using a labial bow. Continued with stage 3, the patient was planned to undergo fixed orthodontic appliance placement to correct the malocclusion.

Discussion: Lip bumper and habitual therapy are proper treatment alternatives for overcoming the oral habit of malocclusion due to lip sucking with the improvement of mentalis muscle hyperactivity. The habit was managed with a lip bumper appliance and parental involvement in habitual therapy.

Conclusion: This case report underscores the efficacy of utilizing a lip bumper appliance as an effective intervention for addressing lip sucking habit in children.

Keywords: Lip bumper; Oral habit; Malocclusion; Human and health; Quality of life

1. Introduction

A habit is an automatic response to a specific situation, typically developed through learning a particular activity and then repeating it over time. This repetition makes the habit more unconscious. Certain oral habits can negatively impact oral health and condition, potentially causing defects in orofacial structures and harmful behaviors that interfere with a child's physical, emotional, or social well-being. The severity of the adverse effects of a habit depends on the frequency, intensity, and duration the habit is practiced (1).

Approximately 15-25% of malocclusions are caused by oral habits. These habits significantly impact the stomatognathic system, particularly the occlusion. The development of both hard and soft tissues is largely affected by malocclusion, which can lead to hypotonic or hypertonic conditions in the perioral soft tissues (2). Malocclusion can result from an

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imbalance in muscle equilibrium, which may be altered by parafunctional habits such as lip sucking, lip biting, and tongue thrusting (3).

These lip habits are often observed either simultaneously with or as a replacement for finger sucking. Such habits can impact the labial and perioral structures. A child engages in this habit by placing their lower lip to hold the upper incisors, creating a lingual force on the lower incisors and a facial force on the upper incisors. This leads to protrusion of the upper incisors and retrusion of the lower incisors, resulting in an increased overjet. The lower lip may exhibit signs of inflammation, a reddish appearance, and teeth marks (2).

Elimination of abnormal habits forms the foundation for ensuring long-term treatment stability. It is understood that lip bumper presents a viable solution for addressing lower lip sucking or biting habits, which contribute to malocclusion. Several studies indicate that a lip bumper can effectively control molar anchorage, expand the lower arch space, and eliminate oral habit. These appliances are commonly used in patients who exhibit lower lip habits like lip sucking. By shielding the lower lip, the lip bumper serves to deter such habits. Additionally, they are utilized in patients with hyperactive mentalis activity, which leads to flattening or crowding of the lower anterior teeth (3).

The purpose of this case report was to underscore the efficacy of utilizing a lip bumper appliance as an effective intervention for addressing lip sucking habit in children.

2. Case History

An 11-year-old male patient accompanied by his mother came to the Department of Pediatric Dentistry and presented for an assessment of protruding upper front teeth and loosened lower lip. The patient's mother disclosed that since the age of 6, the patient had exhibited a habit of lip sucking and object biting, persisting to the present. The patient experiences embarrassment regarding his current condition and expresses a desire for treatment. On extra oral examination, the patient revealed a mesocephalic, symmetric, and convex profile. The patient also showed incompetent lips. Intra oral examination showed mild crowding of the lower anterior, a class 1 molar relationship with an overjet 13 mm, 5 mm overbite, and there is persistence of teeth 73 and 83 (Figure 1). The skeletal analysis in cephalometry revealed a class II skeletal pattern.

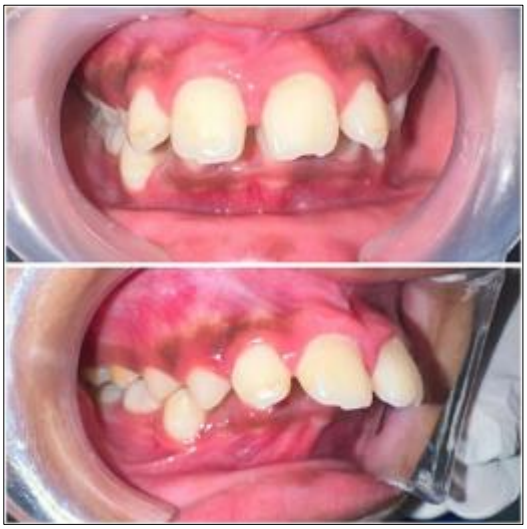

Figure 1 Initial intra oral photographs

The treatment plan was designed with three stages. Stage 1 aimed to eliminate the lip sucking habit of using a lip bumper. Stage 2 focused on correcting maxillary anterior protrusion using a labial bow. Continued with stage 3, the patient was planned to undergo fixed orthodontic appliance placement to correct the malocclusion and achieve a normal overbite and overjet. After addressing the lip sucking habit and aligning the maxillary protrusion, skeletal growth, and space deficiency could be monitored. The patient and his parents were informed about his condition, and informed consent was obtained for the treatment.

The persistence of teeth 73 and 83 were extracted before using the lip bumper appliance. Bands were adapted on the lower M1, and alginate impressions were taken. After establishing the study model, a working model was developed to

help design the appliance. A removable orthodontic appliance labial bow was made for the retraction of maxillary protrusion. The acrylic shield for the lip bumper appliance was fabricated to be positioned anteriorly, away from the labial surface of the lower incisors, and centered over their gingival margin (Figure 2).

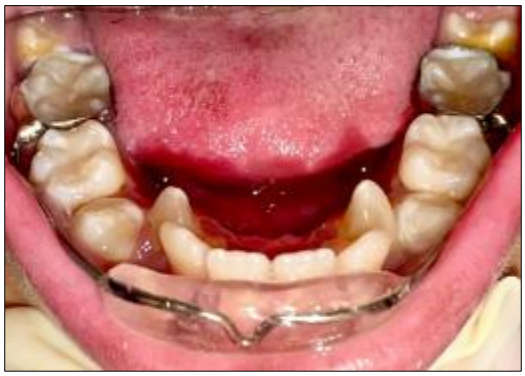

Figure 2 Insertion of lip bumper appliance

On the next appointment, it was cemented after a trial fit evaluation (Figure 2). The patient was advised to wear the appliance for 3-4 months until the habit ceased, and evaluated twice a month for adjustment and activated labial bow on the upper jaw. Both the patient and parents were very cooperative. At the first follow-up visit, a significant reduction of the oral habit was observed. After two months of using the appliance, the patient exhibited competent lips and an enhanced facial profile, indicating the success of the treatment (Figure 3a, 3b).

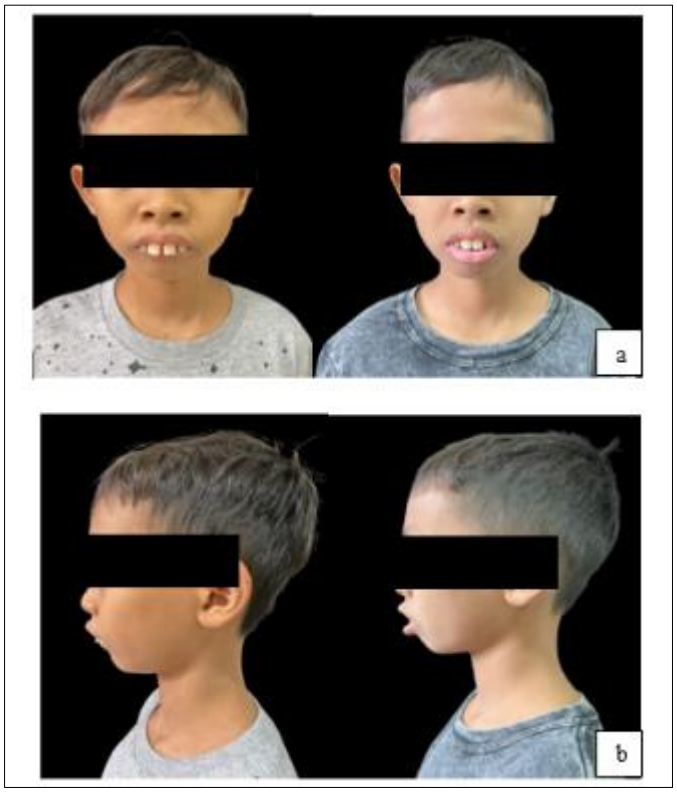

Figure 3 Figure 3a: Extra oral photograph before-after treatment. Figure 3b: Lateral extra oral photograph before-after treatment

The patient has been informed to undergo fixed orthodontic appliance placement to correct the malocclusion and achieve a normal overbite and overjet after the lip sucking habit ceases.

3. Discussion

Oral habits in children such as thumb sucking, finger biting or finger sucking, tongue thrusting, lip biting or sucking, bruxism, mouth breathing pose a great harm to the developing teeth, occlusion, and surrounding of oral tissues. It can produce destructive effects on the dentoalveolar structures. Duration of the habit per day, degree, and intensity of habit are the trinity factors that responsible for any habit to produce detrimental effects. Malocclusion influence the craniofacial morphology and growth, with typical facial features and dentition such as long face, contraction of the upper dental arch, high arched palate, gummy smile, dental malocclusion both Class II and Class III (5,6).

Management of lip sucking habits can benefit from myofunctional therapy, which helps create a lip seal and encourages the development of normal habits. A lip bumper was utilized not only to eliminate the harmful habit but also to improve the tonicity of the labialis and mentalis muscles. This appliance works by keeping the lower lip and cheek muscles away from the mandibular teeth, thereby disrupting the equilibrium around the dentition. Consequently, the unbalanced lingual forces exerted by the tongue lead to forward and lateral expansion of the mandibular arch. Additionally, the pressure exerted by the lower lip against the lip bumper is transferred directly to the lower molars during swallowing, promoting an increase in arch length by causing distalization and distal tipping of the molars (7).

The lip bumper consists of a thick stainless steel wire that stretches from one molar to the opposing molar, positioned away from the front teeth. It fits into round molar tubes with a diameter of 0.93 mm, which are soldered onto bands on the first molars. Additionally, the section of the wire running from canine to canine can be reinforced with acrylic for added strength (4).

For optimal results, the appliance was used continuously for 24 hours over a period of 6 to 18 months, depending on the tooth movement and treatment goals. Moreover, continuous habitual reminders should be given by parents. By two ways approach from the medical and family approach, an overall satisfactory and psychological result were reached. A long-term use of lip bumper showed a certain degree of recurrence, after the outcome has been reached, the use of lip bumper should be evaluated. However, the final outcomes and solution of this case reminds a satisfactory result (7,8,9,10).

4. Conclusion

The presented case report underscores the efficacy of utilizing a lip bumper appliance as an effective intervention for reducing lip sucking habits in children. Through the successful treatment documented in this report, it becomes evident that the lip bumper appliance serves as a valuable treatment in modifying oral habits and promoting oral health. The utilization of a lip bumper appliance facilitated the redirection of oral forces, thereby promoting favorable dental and skeletal changes conducive to improved esthetics and function. Furthermore, the patient's satisfaction and compliance with the treatment highlight the acceptability and feasibility of lip bumper therapy in pediatric dentistry.

Compliance with ethical standards

Acknowledgments

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Disclosure of conflict of interest

The authors declare that there is no conflict of interest regarding the publication of this document.

Statement of ethical approval

The present research work does not contain any studies performed on animal/humans subjects by any of the authors.

Statement of informed consent

Informed consent was obtained from patient included in the study.

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