



Blue Grass Appliance: An Aid to Stop Thumb Sucking Habit in a 8 Year Old Child

S K Srinath¹ and Rani Satish²

¹Department of Pedodontics, Government Dental College, Bangalore 560002, India.

²Department of Orthodontics, V S Dental College, Bangalore, India.

ARTICLE INFO

Article history:

Received: 21 February 2015;

Received in revised form:

15 July 2015;

Accepted: 23 July 2015;

Keywords

Sucking Habit,
Oral,
Thumb.

ABSTRACT

Oral habits are very common and one of the most deleterious habits which pose a problem to pediatric dentists. Oral appliances, if inserted for several months, usually eliminate the habit, however, emotional problems, difficulty with speech and hearing, and self inflicted wounds can occur with such appliances. We present a case of 8 year old girl with thumb sucking habit, successfully managed by a non punitive bluegrass appliance.

© 2015 Elixir All rights reserved.

Introduction

Oral habits are very common and one of the most deleterious habits which pose a problem to Pediatricians and Pedodontists.^{1,2,3} In most of the studies cited in literature, the major concern of the authors is about the etiology of oral habits because these may have an important role in the development of some anomalies and harmful effects on the oro-facial system.^{4,5,6,7} Thumb sucking and nail biting habits not only distort the oro-facial harmony and damage the structure of the mouth but also allow easy spread of infectious diseases.⁸ A study confirmed that the prevalence of *Escherichia coli* and Enterobacteria among children with such oral habits was greater than the children without any oral habits.⁹

Oral habits could be divided into 2 main groups¹⁰

1. **Acquired oral habits:** Include those behaviors which are learned and could be stopped easily and when the child grows up, he or she can give up that behavior and start another one.
2. **Compulsive oral habits:** Consist of those behaviors which are fixed in child and when emotional pressures are intolerable for the child, he or she can feel safety with this habit, and preventing the child from these habits make him or her anxious and worried.

One of the most common repetitive behaviors or habit in infantile period is hand sucking¹¹. The reflex of sucking appears around the 29 weeks of age, that is, one of the first sophisticated patterns of behavior in infant¹². Thumb sucking is the most common oral habit and it is reported that its prevalence is between 13 to 100% in some societies.¹³ The prevalence of this habit is decreased as age increases, and mostly, it is stopped by 4 years of age. If the child chooses this habit in the first year of his or her life, the parents should move away his or her thumb smoothly and attract the child's attention to other things such as toys. After the second years of age, thumb sucking will decrease and will appear just in child's bed or when he/she is tired.¹ In many cases, if the thumb habit continues into the mixed dentition a malocclusion may develop.¹¹

The dental practitioner is often met with stares of parental concern when the palatal crib with or without "spurs" is suggested as the habit-breaking appliance of choice for digital

sucking. If inserted for several months, this type of device usually eliminates the habit in children who want to stop.^{12,13} Emotional problems, difficulty with speech and eating, and iatrogenically "self-inflicted" wounds can occur with such appliances. This type of appliance tends to be regarded as a punitive rather than a supportive treatment.¹⁴

Haskell and Mink introduced Blue grass appliance, also known as habit correction roller which gained universal attention and acceptance. The appliance is indicated for those children who have continued a thumb-sucking habit which is affecting the mixed or permanent dentition. The use of any habit-type appliance should be discussed with the parents and children with a thorough explanation of the purpose of the appliance. Children also should indicate that they want to stop the habit and are willing to try the appliance as an aid to help them stop.¹⁵

In this paper, we report a case of thumb sucking habit where habit was corrected using Bluegrass appliance as a non punitive therapy.

Case Report

An eight year old girl reported to the department of Pedodontics and Preventive Dentistry with parents concerned about her thumb sucking habit (figure1). Child was shy and reluctant to talk. Parents revealed that the child is practicing thumb sucking habit regularly for 8-9 hrs/day during waking hours and unconsciously during sleeping hours. On examination child presented with anterior open bite and tongue thrusting habit (figure2). There was unilateral posterior crossbite on the right side (figure3) and normal class I molar relation on left side (figure 4). Callus formation was seen over her right thumb (figure 5). During the first visit parental counseling was done and ill-effects of thumb sucking habit were pointed out to the child. Parents were asked to motivate the child to stop the habit. On the second visit, child was willing to discontinue the habit but needed reminder as child was unconsciously practicing the habit. A blue grass appliance was planned for the child.

Construction of blue grass appliance (figure 6)

Firstly, molar bands were fabricated and adapted on maxillary molars. Alginate impression was taken and casts were poured with dental stone over which molar bands were

transferred. Next, a blue grass roller was made with acrylic. Roller had a hole in center which was wide enough to roll onto 0.9 mm stainless steel wire with which the appliance was fabricated. After that 0.9 mm stainless steel wire of appropriate length was taken and bent at 90°. The roller was then slid onto the horizontal side and trapped by bending the wire beyond roller at 90°. The wire was then adapted over the palate extending from either side of molars. No contact was established by the roller with the palatal tissues so that there was enough room for rollers to spin freely. After that appliance was properly adapted, it was secured over the cast for soldering using plaster. Acrylic was covered with plaster to prevent distortion due to exposure to flame. The wire was soldered to molar bands and the appliance was cemented using luting cement.



Figure 1. Child with thumb sucking habit



Figure 2. Intra oral frontal view



Figure 3. Intra oral right oblique view



Figure 4. Intra oral left oblique view



Figure 5. Callus formation on right thumb



Figure 6. Blue Grass Appliance delivered

The patient was instructed to roll the acrylic roller with tongue whenever she feels like sucking her thumb. The child was comfortable with the appliance and played by rolling the roller with the tongue. Patient was recalled after a month for check-up. The parents reported discontinuation of habit by the child within few days of placement of the appliance. By the end of 4 months, callous formation had almost disappeared. Patient was asked to wear the appliance for almost 6 months to avoid relapse of the habit.

Discussion

A pediatric dentist often comes across digit sucking habit as it is a common phenomenon among pediatric age group. Digit sucking includes active or passive sucking of any finger or

thumb. Prolonged digit sucking habits can lead to several deleterious effects on the child. A child may develop speech problems, including mispronouncing Ts and Ds, lisping, and thrusting out the tongue when talking.¹⁶ Children who suck their thumbs tend to tune out what is happening around them and lose some ability to concentrate on school work. Sometimes reduction of peer acceptance and/or bullying may occur.¹⁷ The effect of prolonged sucking habit in children can also affect development of occlusion. It may result in anterior open bite, increased over jet, lingual inclination of lower incisor and labial inclination of maxillary anteriors, posterior crossbite, deep palate and compensatory tongue thrust.^{18,19}

If the child stops the habit before the age of 5 years no treatment is needed and dental changes will be corrected spontaneously soon after giving up the habit.²⁰ Once the child is mature enough to understand, the pediatric dentist should conduct a direct interview with the child and encourage the child to stop the habit. This can give the child more pride and self-confidence. Child should be rewarded for his successful attempts at stopping the habit and should be reminded by the parents again if he fails to discontinue the habit. The final stage in treatment is the use of orthodontic appliance whether fixed or removable, which can play the role of reminder and can reduce the urge of thumb sucking. For long-term habits or unwilling patients, the fixed intra oral appliance is the most effective inhibitor. In the case of using fixed or removable appliance, we should alarm the parents about potential problems in speaking or eating during the first 24 to 48h, which are usual and self correcting. After active phase of treatment, the appliance should remain in place for more 3 to 6 month to minimize the relapse potential.¹

In this paper we present a case of successful management of thumb sucking habit by giving a non-punitive appliance to the patient which was first given by Haskell and Mink. They constructed this oral appliance by utilizing the principle of positive reinforcement. They got the idea from the equine industry, where a bit with copper rollers was used to distract irritable horses. In their original design they constructed a six-sided Teflon roller to slid in 0.045 stainless steel wire which was soldered to the molar orthodontic bands. The roller was placed in the most superior position of the palate so that it does not cause any obstruction while eating and does not interfere with speech. The Teflon roller must not contact the palate so that the patient can roll it with the tongue. This device works through a counter-conditioning response to the original conditioned stimulus for thumb sucking. This appliance is indicated in children in the early or late mixed dentition who have been consulted and have a desire to stop their thumb sucking. Their usual sucking habits are at night or when they are tired or upset.¹⁵

Similar appliance called Lingual Pearl was used as a habit breaking appliance, for retraining the tongue and for multiple clinical applications.²¹ Baker modified blue grass appliance with multiple rollers/beads and thus expanding its use from primary to permanent dentition. Another advantage of this appliance was reduced bulk.²²

In the present study, blue grass appliance as recommended by Haskell was used. Instead of a Teflon roller, an acrylic six sided roller was used due to unavailability of Teflon roller. After placement of the appliance the patient was instructed to play with the roller with the tongue. This allows the child to accept the appliance and learn the neuromuscular activity to normalize the tongue position. When a spinning roller is placed in close proximity to the tip of the tongue, "fascinating" response is quickly implemented due to neuromuscular and sensitive nature

of tongue. Since the rollers are not in contact with palatal tissues, children can roll them with their tongues. Within few days, the tongue establishes new non harmful habit of playing with roller. Hence, this appliance works through counter conditioning response to the original conditioned stimulus for thumb sucking. Psychologically, it is acceptable for parents also as they can encourage the child to play with the roller instead of instructing the child to cease the habit all the time and making him/her anxious. Also, the roller does not obstruct while eating, presents minimum disturbances with speech, and stimulates tongue movement. It is esthetic and child becomes comfortable quickly. The patient believes to have acquired a new toy in mouth to play with tongue.²³ In the present case the habit was discontinued in 6 months time.

Conclusion

Most parents are not aware of the harmful oral habits and their bad effects. Dentists should provide parents with information about different types of oral habits, etiology of habits especially with emphasis on role of stress in development of these habits. Habit breaking appliances are very effective and can eliminate or reduce future orthodontic treatment time. They are relatively easy to fabricate, and a valuable tool for the clinician. Children seem to adapt quickly to the appliances and when properly constructed, discomfort is minimal. Treatment time will vary from patient to patient and an occasional persistent habit will need to be reevaluated if progress is not made. There are many different designs and they all have their specific treatment indicators. It is necessary to become familiar with the different types of habit appliances and learn their individual pros and cons. Blue grass appliance is a non punitive appliance and esthetic and child can wear it comfortably. It can be given as a supportive therapy as it requires no reminding or bribing, and parents can be freed of anxiety and frustration. It does not interfere with child's growth and eliminates the habit with limited complications.

References

1. Maguire JA. The evaluation and treatment of pediatric oral habits. *Dent Clin North Am.* 2000; 44(3): 659-69.
2. Carisson GE, Egermark I, Magnusson T. Predictors of bruxism, other oral parafunctions, and tooth wear over a 20-year follow-up period. *J Orofac Pain.* 2003; 17(1): 50-7.
3. Josell SD. Habits affecting dental and maxillofacial growth and development. *Dent Clin North Am.* 1995; 39(4): 851-60.
4. Tarjan I. Significance of bad habits in orthodontics. *Fogorv Sz.* 2002; 95(4):135-42.
5. Romanou-Kouvelas K, Kouvelas N. Oral habits. Etiology and treatment. *Hell Stomatol Chron.* 1988; 32(4): 285-91.
6. Aznar T, Galan AF, Marin I, Dominguez A. Dental arch diameters and relationships to oral habits. *Angle Orthod.* 2006; 76(3): 441-5.
7. Fujita Y, Motegi E, Nomura M, Kawamura S, Yamaguchi D, Yamaguchi H. Oral habits of temporomandibular disorder patients with malocclusion. *Bull Tokyo Dent Coll.* 2003; 44(4): 201-7.
8. Vogel LD. When children put their fingers in their mouths. Should parents and dentists care? *N Y State Dent J.* 1998; 64(2): 48-53.
9. Baydaş B, Uslu H, Yavuz I, Ceylan I, Dagsuyu IM. Effect of a chronic nail-biting habit on the oral carriage of Enterobacteriaceae. *Oral Microbiol Immunol.* 2007; 22(1):1-4.
10. Finn SB (1998). *Clinical Pedodontics.* Philadelphia: Saunders, 370-80.
11. Kaplan M: A note on the psychological implications of thumb-sucking. *J Pediatr* 37:555-60, 1950.

12. Davidson PO, Haryett RD, Sandilands M, Hansen FC: Thumbsucking: habit or symptom? *J Dent Child* 34:252-59, 1967.
13. Haryett RD, Hansen FC, Davidson PO: Chronic thumb-sucking: a second report on treatment and its psychological effects. *Am J Orthod* 57:164-78, 1970.
14. Massler M, Wood AWS: Thumb-sucking. *J Dent Child* 16:1-9, 1949.
15. B. S. Haskell and J. R.Mink, "An aid to stop thumb sucking: the "Bluegrass" appliance," *Pediatric Dentistry*, vol. 13, no. 2, pp. 83-85, 1991.
16. Larsson E (1978). The effect of earlier dummy-and finger sucking in 16- year old children compared with children without earlier sucking habit. *Swed. Dent. J.* 1:23-33.
17. Popovich F, Thompson GW (1974). Analysis of factors associated with persisting maxillary diastema. *J. Dent. Res.* 53:272
18. E.N. Gale and W.A.Ager, "Thumb sucking revisited," *American Journal of Orthodontics*, vol. 55, no. 2, pp. 167-170, 1979.
19. T. A. Yemitan, O. O. daCosta, O. O. Sanu, and M. C. Isiekwe, "Effects of digit sucking on dental arch dimensions in the primary dentition," *African Journal of Medicine and Medical Sciences*, vol. 39, no. 1, pp. 55-61, 2010.
20. Warren JJ, Bishara SE (2001). Effects of oral habits duration on dental characteristics in the primary dentition. *J. Am. Dental Assoc.*, 132(12): 1685-1693.
21. A. K. Ritto and P. Leitˆao, "The lingual pearl," *Journal of Clinical Orthodontics*, vol. 32, no. 5, pp. 318-327, 1998.
22. C. Baker, "The modified blue grass appliance," *Journal of Clinical Orthodontics*, vol. 17, no. 9, pp. 535-537, 2000.
23. Diwanji A, Jain P, Doshi J, Somani P, Mehta D. Modified Bluegrass Appliance: A Nonpunitive Therapy for Thumb Sucking in Pediatric Patients—A Case Report with Review of the Literature. *Case Rep Dent* 2013; 2013: 537.