



Original Research

Prevalence of habit breaking appliance therapy in 6 to 12 year-old children - A cross-sectional study

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ABSTRACT

Background: Habits are certain oral activities like digit sucking, thumb sucking, lip sucking, and mouth breathing which can occur consciously or unconsciously. When these habits are automatic, particularly in children, they can lead to dental issues or malocclusion. The primary treatment for these patients is habit-breaking appliance therapy. These appliances function by curbing oral habits and thereby preventing malocclusion.

Aim: To assess the prevalence, gender, and distribution of usage of habit-breaking appliances among 6 to 12-year-old children

Materials and Methods: A total of 2973 patients, ranging in age from 6 to 12 years, who underwent pulpectomy habit-breaking appliances therapy were selected, and their treatment details such as duration, type of appliance were obtained from the patient records to obtain the prevalence. Information on habits and habit-breaking appliances was also collected, noted and tabulated in excel and imported to SPSS. Descriptive statistics and chi-square test were done. There was a statistical significance between age and habits-breaking appliances ($p < 0.05$).

Result: Of the 2973 records evaluated, it was noted that fixed appliances for tongue thrusting habits accounted for 29.82% of the treatments. Among children aged 6-8 years, fixed appliances for thumb-sucking were the most commonly used. Additionally, fixed appliances for thumb-sucking were the most frequently utilized habit-breaking devices among males.

Conclusion: In conclusion, the use of habit-breaking appliances was more frequent among males than female children in the studied population. Tongue thrusting emerged as the most common oral habit, with the tongue crib being the preferred appliance for addressing this issue.

Keywords: Habit-breaking, Malocclusion, Tongue thrusting, Thumb sucking.

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INTRODUCTION

Habits are routines of behavior that individuals, including children, perform either consciously or unconsciously¹. Prolonged oral habits can negatively impact dental health and lead to malocclusion, depending on their intensity, duration, and frequency during growth and development. This can result in malocclusion and changes in facial tissues and bones.² Oral habits are the most common cause of malocclusion.³ Since the oral cavity is a primary area for expressing emotions and relieving passion and anxiety in both children and adults, activities such as stimulating this region with the tongue, fingers, nails, or cigarettes can serve as palliative actions.⁴ Common habits include thumb sucking, which is seen in about 50% of the population, as well as tongue thrusting, mouth breathing, nail biting, lip chewing, and bruxism. These habits are prevalent in society but often go unnoticed. Oral habits can be categorized into two types: acquired and compulsive.⁵ Acquired habits can be easily stopped as the child grows, whereas compulsive habits become ingrained and persist when a child experiences intolerable emotional stress. Oral habits that affect the teeth and surrounding structures include thumb sucking, tongue thrusting, lip biting, bruxism, and mouth breathing.⁶

Oral habits such as thumb sucking, tongue thrusting, lip biting, and mouth breathing are common among preschool children and can have significant long-term effects on dental health and facial development. These habits, if prolonged, can lead to malocclusions such as anterior open bite, increased overjet, crossbite, and other dental irregularities. Early intervention through habit-breaking appliance therapy is crucial to prevent these malocclusions and promote healthy dental development.

Thumb sucking is the most common oral habit, influenced by the parents' education, the child's nutrition, and the habit itself. It can cause dental problems such as anterior open bite and increased overjet.⁷ Tongue thrusting arises from a prolonged transition between infantile and adult swallowing patterns, leading to malocclusions like open bite, crossbite, and overjet.⁸ To prevent these issues, habit-breaking appliances are used. Common devices for addressing parafunctional oral habits include tongue cribs for tongue thrusting, lip bumpers for lip biting, and oral screens for mouth breathing.

Despite the known benefits of habit-breaking appliances, there is limited data on their prevalence and usage among preschool children. Understanding the extent to which these appliances are used and their effectiveness in this age group is essential for dental professionals to develop targeted strategies for early intervention and education.

This retrospective study aims to evaluate the prevalence of habit-breaking appliance therapy among preschool children attending university dental hospitals. By analyzing the usage patterns and outcomes of these appliances, the study seeks to provide insights into the current practices and effectiveness of early intervention in preventing dental malocclusions. This research will contribute to the growing body of knowledge on pediatric dental health and highlight the importance of early treatment in mitigating the adverse effects of parafunctional oral habits.

MATERIALS & METHODS:

Study Design

This cross-sectional study was conducted to determine the prevalence of habit-breaking appliance therapy among 2973 children. The study was carried out over six months from June 2019 to March 2021.

Study Population

The study population consisted of preschool children aged 4 to 12 years attending various preschools in Chennai. The inclusion criteria were:

Children aged between 4 and 12 years.

Children whose parents/guardians provided informed consent.

Children without any underlying medical conditions that could influence oral habits.

Sample Size

A sample size of 2973 preschool children was determined based on the convenience sampling technique and the prevalence rate of oral habits among children. A stratified random sampling technique was employed to ensure representation from different preschools.

Data Collection: Data were collected using clinical examination

Clinical Examination: Each child underwent a clinical oral examination conducted by a trained dentist to confirm the presence of oral habits and the use of habit-breaking appliances. The examination included an assessment of the oral cavity to check for signs of habit-related malocclusion or other dental issues.

Data Analysis

The collected data were entered into a database and analysed using statistical software (e.g., SPSS version 25.0). Descriptive statistics were used to present the prevalence of habit-breaking appliance therapy. Independent variables were demographics such as age, gender, etc. The dependent variable was the patient who had undergone habit-breaking appliance therapy and the type of appliance. Chi-square tests were employed to examine the association between demographic details and the use of habit-breaking appliances. A p-value of less than 0.05 was considered statistically significant.

Ethical Considerations

The study was approved by the Institutional Review Board (IRB) and informed consent was obtained from the parents/guardians of all participating children. The confidentiality of the participants was maintained throughout the study, and data were used solely for research purposes.

RESULTS

Overall, 2,973 patients out of the entire hospital set-up OP records were analyzed for the presence of any para-functional oral habits. Out of 2,973 Patients, Parafunctional oral habits were noticed and screened in 570 patients. Among them, 85 patients had thumb or digit-sucking habits, 159 patients had tongue-thrusting habits, 99 patients had lip biting, and 227 patients had mouth-breathing habits either separately or associated with other habits like bruxism. Out of all the patients with parafunctional habits, only 57 patients were treated with habit-breaking appliances. Among the total study sample, 17 (29.8%) children were 6 to 8 years of age, 22 (38.6%) children were 8 to 10 years of age, and 18 (31.6%) children were 10 to 12 years of age (As shown in figure 1).

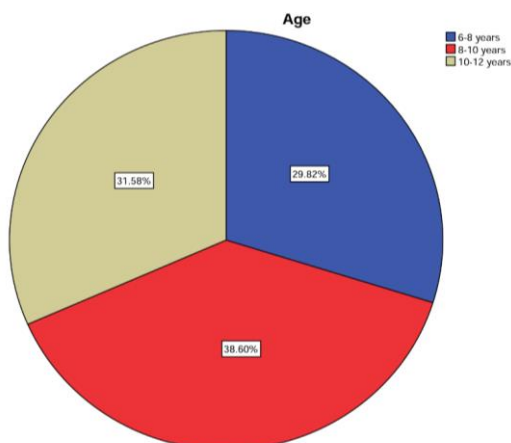


Figure 1 shows a pie chart shows the age wise distribution among the children. Blue colour denotes children of age 6-8 years, Red colour denotes children of age 8-10 years and grey colour denotes children of age 10-12 years. 29.82% children belonged to the group of 6-8 years, 38.60% children belonged to the group of 8-10 years and 31.58% children belonged to the group of 10-12 years. Children belonging to the age group of 8-10 years are treated more with habit breaking appliances.

Vishnoi et al showed a significant difference in the age-wise prevalence of oral habits [29] Anila et al reported thumb sucking was high in (6-8 yr) younger children when compared to older children (9-13yrs) and mouth breathing more prevalent in males and females in his records[30]. Asopa et al reported tongue thrusting more prevalent in 11-13yrs [31]. Among the total study sample, 23(40.4%) children were female, 34(59.6%) children were male (As shown in Figure 2).

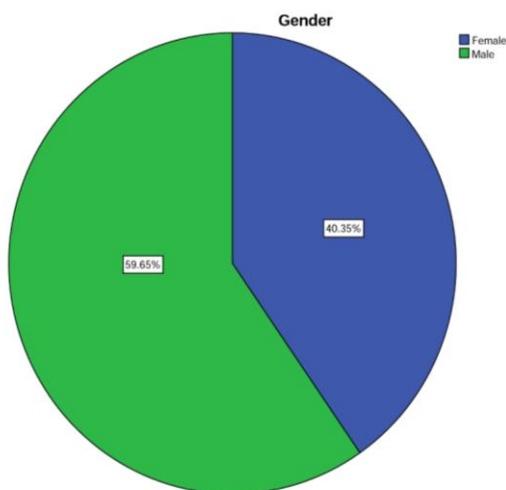


Figure 2 shows the pie chart showing the gender distribution among children. Blue colour denotes female children and green colour denotes male children. 40.35% of children were female and 59.65% of children were male. Males were treated more with habit breaking appliances in comparison to female children.

Among the total study sample, 17 (29.8%) children had undergone fixed appliance therapy for tongue thrusting habit, 3 (5.26%) children had undergone removable type of appliance therapy for tongue thrusting habit, 14 (24.56%) children had undergone fixed appliance therapy for thumb sucking habit, 6 (10.53%) children had undergone removable type of appliance therapy for thumb sucking habit, 6 (10.53%) children

had undergone fixed appliance therapy for lip biting habit, 1 (1.75%) children had undergone removable type of appliance therapy for lip biting habit, 10 (17.54%) children had undergone oral screen therapy for mouth breathing patients (As shown in figure 3).

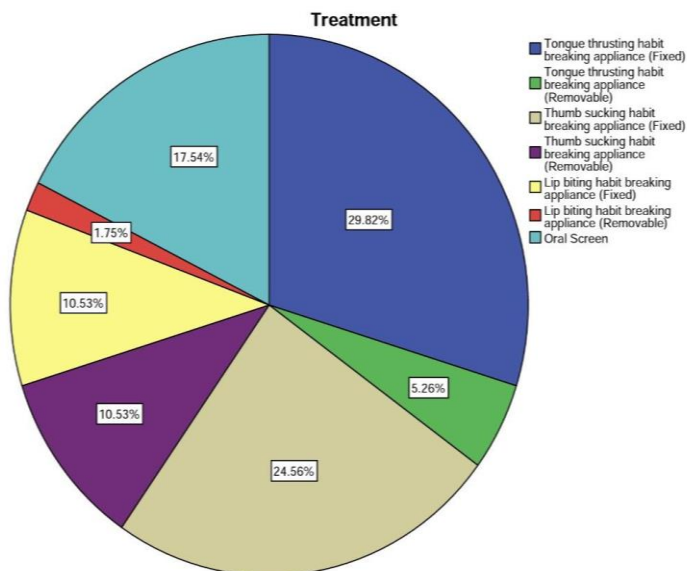


Figure 3 shows pie chart showing the distribution and frequency of different habit breaking appliance therapy in the study population where blue colour (29.82%) denotes fixed appliance for tongue thrusting habit, green colour (5.26%) denotes removable type of appliance for tongue thrusting habit, grey colour (24.56%) denotes fixed appliance for thumb sucking habit, violet colour (10.53%) denotes removable type of appliance for thumb sucking habit, yellow colour (10.53%) denotes fixed appliance for lip biting habit, Red colour (1.75%) denotes removable type of appliance for lip biting habit, Cyan colour (17.54%) denotes oral screen therapy for mouth breathing patients. Tongue thrusting habit breaking appliance was the most treated appliance therapy which shows a higher percentage of children having tongue thrusting habit.

Among the total study sample, almost all types of habit breaking appliances were commonly advised in the 8-10yrs age group rather than 6-8yrs and 10-12 yrs age groups (As shown in figure 4).

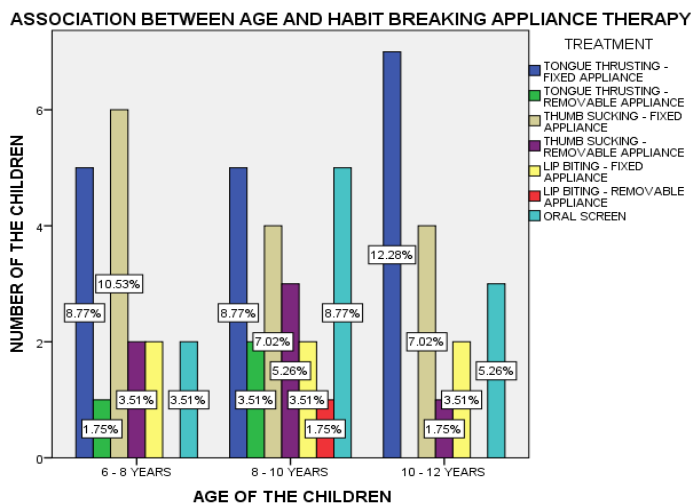


Figure 4 shows bar chart which depicts the correlation between habit breaking appliances therapy and various age groups. X axis denotes age distribution, Y axis denotes number of patients treated with various appliances. Chi-square test was done and was statistically significant. (Pearson Chi Square=11.514, P value=0.021(< 0.05) All types of habit-breaking appliances were commonly advised in the age group of 8-10 years rather than 6- 8 years and 10-12 yrs age groups. The most frequently used appliances in the 6-8 years age group were fixed appliances for thumb sucking habit (grey) whereas in the 8-12 years age group, fixed appliances for the tongue thrusting habit (blue) was used.

Commonly used appliances in the 6-8 years age group were fixed appliance for thumb sucking habit whereas in the 8-12 years age group, fixed appliances for tongue thrusting habit was used.

Among the total study sample, the Fixed appliance for thumb sucking habit was the most commonly used habit-breaking appliance in males and fixed appliance for tongue thrusting habit in females (As shown in figure 5).

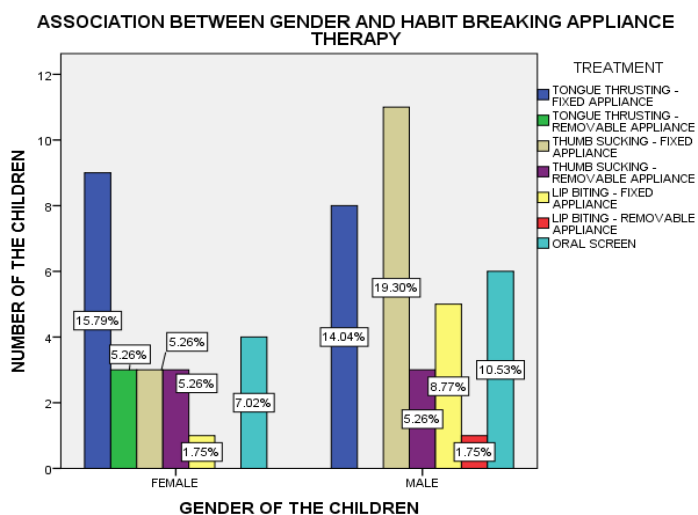


Figure 5 shows bar chart which shows the correlation between various types of habit breaking appliances treatment and gender of the children. X axis represents gender distribution, Y axis represents number of patients treated with various appliances. Chi Square test was done and was found to be statistically not significant (Pearson Chi square=2.863, P value=0.581(>0.05). Fixed appliance for thumb sucking habit was

the most frequently used habit-breaking appliance in males and fixed appliance for tongue thrusting habit in females.

DISCUSSION:

As far as habits are concerned there is no special recommended treatment regimen, but increasing awareness of the patient, intra-oral appliances and certain psychological therapy with behaviour changes have been reported to be effective.⁹ Thumb sucking is the most common oral habit and its prevalence is between 13 to 100% in some societies. Previous literature has found the incidence of thumb sucking is more than 50%.¹⁰ In accordance with our study (Figure 4), the prevalence of thumb sucking habit decreases with increasing age, it is expected to be stopped by 4 years of age.^{11,12}

Tongue thrusting is more common in children of age 6-12 years as their permanent tooth starts to erupt. They psychologically tend to feel it through the tongue, it is the frequent etiology of open bite. Lip biting happens majorly to lower lips¹³ because of which maxillary incisors tip labially and mandibular incisors are pushed lingually with the lower lip wedged between upper and lower incisors. In extreme cases it leads to vermilion hypertrophy, and chronic cold sore.^{14,15,16} Lip bumpers are recommended in such cases. Mouth breathing results in proclination and spacing of maxillary anteriors.¹⁷ At extreme cases patients develop posterior crossbite, anterior open bite. Oral screens are a recommended regimen for mouth breathing habits.¹⁸ Further research is needed as oral habits have major impacts on both facial and skeletal concern. Study can be extended for further diagnosis and treatment planning. Proper counselling on awareness of early correction is required.¹⁹ Thus the study serves as an evidence and adds to the consensus that can be utilised for further studies at the larger population and more clinical studies.

The limitation of the present study is that there are very few study models insufficient to show the statistics of the entire population. As children from different geographical locations can also have an impact on different habit acquisition, it also has to be noted.²⁰ Since it was a retrospective study, manual errors may occur during data collection. Further, advancements with diverse populations have to be done to analyse the frequency of parafunctional oral habits and productivity of using such habit breaking appliances to actively intercept developing malocclusion.

CONCLUSION:

Within the limits of this study, we concluded that the 1.29% of patients had undergone habit breaking appliance therapy. Among the patients with parafunctional oral habits, Tongue thrusting was the most commonly noticed parafunctional habit among the patients treated with habit breaking appliances and tongue crib was the most frequently used habit breaking appliance. All types of habit breaking appliances mentioned were commonly advised in the age group of 8-10yrs rather than 6-8yrs and 10-12yrs. Females were more prevalent with tongue thrusting habit and had undergone tongue crib appliance therapy whereas Males were more prevalent with thumb sucking habit and had undergone habit breaking fixed appliance therapy for thumb sucking.

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Nil

CONFLICTS OF INTEREST

There are no conflicts of interest

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