

HABIT BREAKING APPLIANCES IN THE MANAGEMENT OF PARAFUNCTIONAL ORAL HABITS

Harini Kumaran¹ Nivethigaa B², Nivedhitha M.S³

¹*Saveetha Dental College and Hospitals, Saveetha Institute of Medical and Technical Sciences, Saveetha University, Chennai, India*

²*Senior Lecturer, Dept of Orthodontics, Saveetha Dental College and Hospitals, Saveetha Institute of Medical and Technical Sciences, Saveetha University, Chennai, India*

³*Professor, Dept of Conservative Dentistry & Endodontics, Saveetha Dental College and Hospitals, Saveetha Institute of Medical and Technical Sciences, Saveetha University, Chennai, India*

¹151501077.sdc@saveetha.com

²nivedhigaab.sdc@saveetha.com

³nivedhitha@saveetha.com

ABSTRACT

Oral habits such as finger and thumb sucking, lip sucking, mouth breathing when used excessively or continuously can lead to poor dental health or malocclusion. The use of habit breaking appliances will restrict oral habits and prevent malocclusion. The aim of this study was to evaluate the prevalence, gender and age distribution of usage of habit breaking appliances in the management of parafunctional oral habits. 44,100 patient records were reviewed from June 2019 to March 2020. Patients who had undergone treatment with habit breaking appliances were selected and their treatment details were obtained from the patient records to obtain the prevalence. Details on habits and habit breaking appliances were also 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 ($p < 0.05$). No statistical significance was noted between gender and appliance usage. Treatment with habit breaking appliances was more prevalent in males. Thumb sucking was the most prevalent habit among the studied population and tongue crib was the preferred choice of appliance.

Key words

Habit breaking appliance; malocclusion; oral habits; thumb sucking.

INTRODUCTION

Habits are a repetitive action that is being done automatically (Shahraki, Yassaei and Moghadam, 2012; Kamdar and Al-Shahrani, 2015). The presence of oral habits affects dental health and brings about malocclusion depending on frequency, duration, intensity during growth and development which leads to changes in bone and facial tissues and occlusion (Warren *et al.*, 2001; Restrepo, 2010; Oropeza *et al.*, 2014).

Habits are the most frequent cause of these malocclusion seen in early childhood and mixed dentition stage (Aasim *et al.*, 2014). Oral habits are divided into acquired oral habits and compulsive oral habits (Sb, 1998). Oral habits which affect the dentoalveolar structures are thumb sucking, finger biting or finger sucking, tongue thrusting, lip biting or lip sucking, bruxism, mouth breathing (Kamdar and Al-Shahrani, 2015). Identification of any of the above mentioned habits and recognition of risk factors prevent major anomalies.

Tongue thrusting takes place because of delayed transition between infantile and adult swallowing pattern. It results in open bite, cross bite, increased overjet, class 2 malocclusions (Melsen, Stensgaard and Pedersen, 1979). Tongue crib appliances are effective in breaking the tongue thrusting habit (Haryett *et al.*, 1967; Schweska-Polly, Engelke and Hoch, 1995; Villa and Cisneros, 1997; Sayin *et al.*, 2006). Thumb sucking causes anterior open bite, increased overjet, posterior crossbite, lingual inclination of lower incisors and labial inclination of upper incisors (Kamdar and Al-Shahrani, 2015). The use of habit breaking appliances prevent development of such malocclusion.

Previously our college had conducted many clinical trials (Samantha *et al.*, 2017) (Felicita, 2017b) (Jain, Kumar and Manjula, 2014) (Felicita, Chandrasekar and Shanthasundari, 2012) (Dinesh *et al.*, 2013; Rubika, Felicita and Sivambiga, 2015), *in vitro* studies (Kamisetty *et al.*, 2015) (Ramesh Kumar *et al.*, 2011) (Sivamurthy and Sundari, 2016), literature updates (Krishnan, Pandian and Kumar S, 2015) (Vikram *et al.*, 2017) (Viswanath *et al.*, 2015) (Pandian, Krishnan and Kumar, 2018) and case reports (Felicita, 2017a) (Felicita and Sumathi Felicita, 2018) in the last five years. Now we are focussed on retrospective studies. Hence, a retrospective study was planned to evaluate the prevalence, gender and age distribution of habit breaking appliances used in the management of parafunctional oral habits.

MATERIALS AND METHODS

The present study was a cross sectional retrospective study done in a university setting. Ethical approval for this study was obtained from the Institutional Scientific Review Board. Case records of 44,100 patients were reviewed from the archives of patient records between June 2019 to March 2020. Patients with various parafunctional habits were segregated and those treated with different habit breaking appliances were noted. 26 patients with oral habits had undergone orthodontic treatment with habit breaking appliances. Samples were cross verified by another examiner to avoid any missing data. Sampling bias was minimised by excluding incomplete data. Details on habits and habit breaking appliances were tabulated in excel and were imported to statistical software SPSS (version 20). Descriptive statistics tests and chi square tests were performed to determine the statistical significance of the results obtained.

RESULTS AND DISCUSSION

Overall, 44,100 patients records were reviewed for the presence of any parafunctional habits. Parafunctional habits were reported in 570 patients. 85 patients had thumb sucking habits, 159 patients had tongue thrusting habits, 99 patients had lip biting, 227 patients had mouth breathing habits either alone or associated with other habits like bruxism. Among the patients with parafunctional habits, only 26 patients (4.56%) were treated with habit breaking appliances.

Vishnoi *et al* reported a significant difference in age wise prevalence of oral habits (Vishnoi *et al.*, 2017) Anila *et al* reported thumb sucking was high in (4-8 yr) younger children compared to older children (9-13yrs) and mouth breathing more prevalent in males and females (Anila *et al.*, 2018). Shetty and Munshi reported thumb sucking, pencil biting & tongue thrusting were prevalent highly across 3-6yrs, mouth breathing, bruxism in 7-12yrs, nail biting & cheek biting in 13-16yrs (Shetty and Munshi, 1998). Asopa *et al* reported tongue thrusting more prevalent in 11-13yrs (Asopa, Bansal and Sharma, 2015). Vishnoi *et al* reported tongue thrusting more prevalent in males and females (Vishnoi *et al.*, 2017). Garde *et al* reported bruxism as most common in male and female (Garde *et al.*, 2014).

In 6-12 yrs age group, 14 (53.85%) patients had tongue crib, 1 (3.85%) patients had Hawley's appliance with tongue crib, 4 (15.38%) patients had lip bumper, 2 (7.69%) patients had soft splint In the 13-18 yrs age group, 2 (7.69%) patients had tongue crib, 2 (7.69%) patients had hawley's appliance with anterior bite plane, 1 (3.85%) patient had Hawley's appliance with tongue crib. Commonly used appliances in the 6-12 year age group was tongue crib whereas in the 13-18 year age group, tongue crib and hawley's appliance with anterior bite plane was used. The association between age groups and type of habit breaking

appliances was found to be statistically significant. (Chi square test; P value=0.021; < 0.05)(Figure 1). Sinem Tasman et al reported significant decrease in resting and swallowing pressures on crib appliance suggest tongue adaptation to new position by appliance(Taslan, Biren and Ceylanoglu, 2010).

In males, 10(38.46%) patients had tongue crib, 2(7.69%) patients had lip bumper, 1(3.85%) patients had hawley's appliance with anterior bite plane and soft splint. In females,6(23.08%) patients had tongue crib, 2(7.69%) patients had hawley's appliances with tongue cribs and lip bumper, 1(3.85%) patients had hawley's appliance with anterior bite plane and soft splint. Tongue cribs were the most prevalent habit breaking appliances in males and females.However, the association between gender and type of habit breaking appliances was not statistically significant (Pearson correlation: Chi square test; P value=0.581; > 0.05)(Figure 2)The findings from the present study add to the consensus of the previous study. However few studies contradict the present study because of different populations.

LIMITATIONS

Small sample size which does not provide results of the entire population Since it was a retrospective study, manual errors may occur during data collection.

Further, multicentric studies with diverse populations can be done to determine the prevalence of parafunctional habits and usage of habit breaking appliances to actively intercept developing malocclusion.

CONCLUSION

This study concluded that the 1.29% of patients of the overall population had parafunctional habits. Among the patients with parafunctional habits, Nearly five percent of patients with various habits have been treated with habit breaking appliances. Thumb sucking was the most prevalent parafunctional habit among the patients treated with habit breaking appliances and tongue crib was the most commonly used habit breaking appliance. There was no significant association between gender and the type of appliance used for habit intervention.

AUTHOR CONTRIBUTIONS

All authors have equal contribution towards this research work

CONFLICT OF INTEREST

Nil

REFERENCES

- [1] Aasim, F. et al. (2014) 'Oral habits and their implications'. unknown, 1(4), pp. 179–186. Available at: <http://dx.doi.org/> (Accessed: 10 June 2020).
- [2] Anila, S. et al. (2018) 'Prevalence of oral habits among 4–13-Year-Old children in Central Kerala, India', *Journal of Natural Science, Biology and Medicine*, p. 207. doi: 10.4103/jnsbm.jnsbm_14_18.
- [3] Asopa, K., Bansal, A. and Sharma, S. (2015) 'Prevalence of Oral Habits among Eleven to Thirteen Years Old Children in Jaipur', *International Journal of Clinical Pediatric Dentistry*, pp. 208–210. doi: 10.5005/jp-journals-10005-1314.
- [4] Dinesh, S. P. S. et al. (2013) 'An indigenously designed apparatus for measuring orthodontic force', *Journal of clinical and diagnostic research: JCDR*, 7(11), pp. 2623–2626. doi: 10.7860/JCDR/2013/7143.3631.

- [5] Felicita, A. S. (2017a) 'Orthodontic management of a dilacerated central incisor and partially impacted canine with unilateral extraction - A case report', *The Saudi dental journal*, 29(4), pp. 185–193. doi: 10.1016/j.sdentj.2017.04.001.
- [6] Felicita, A. S. (2017b) 'Quantification of intrusive/retraction force and moment generated during en-masse retraction of maxillary anterior teeth using mini-implants: A conceptual approach', *Dental press journal of orthodontics*, 22(5), pp. 47–55. doi: 10.1590/2177-6709.22.5.047-055.oar.
- [7] Felicita, A. S., Chandrasekar, S. and Shanthasundari, K. K. (2012) 'Determination of craniofacial relation among the subethnic Indian population: a modified approach - (Sagittal relation)', *Indian journal of dental research: official publication of Indian Society for Dental Research*, 23(3), pp. 305–312. doi: 10.4103/0970-9290.102210.
- [8] Felicita, A. S. and Sumathi Felicita, A. (2018) 'Orthodontic extrusion of Ellis Class VIII fracture of maxillary lateral incisor – The sling shot method', *The Saudi Dental Journal*, pp. 265–269. doi: 10.1016/j.sdentj.2018.05.001.
- [9] Garde, J. B. et al. (2014) 'An epidemiological study to know the prevalence of deleterious oral habits among 6 to 12 year old children', *Journal of international oral health : JIOH*, 6(1), pp. 39–43. Available at: <https://www.ncbi.nlm.nih.gov/pubmed/24653601>.
- [10] Haryett, R. D. et al. (1967) 'Chronic thumb-sucking: The psychologic effects and the relative effectiveness of various methods of treatment', *American Journal of Orthodontics*, pp. 569–585. doi: 10.1016/0002-9416(67)90069-3.
- [11] Jain, R. K., Kumar, S. P. and Manjula, W. S. (2014) 'Comparison of intrusion effects on maxillary incisors among mini implant anchorage, j-hook headgear and utility arch', *Journal of clinical and diagnostic research: JCDR*, 8(7), pp. ZC21–4. doi: 10.7860/JCDR/2014/8339.4554.
- [12] Kamdar, R. J. and Al-Shahrani, I. (2015) 'Damaging oral habits', *Journal of international oral health : JIOH*, 7(4), pp. 85–87. Available at: <https://www.ncbi.nlm.nih.gov/pubmed/25954079>.
- [13] Kamisetty, S. K. et al. (2015) 'SBS vs Inhouse Recycling Methods-An Invitro Evaluation', *Journal of clinical and diagnostic research: JCDR*, 9(9), pp. ZC04–8. doi: 10.7860/JCDR/2015/13865.6432.
- [14] Krishnan, S., Pandian, S. and Kumar S, A. (2015) 'Effect of bisphosphonates on orthodontic tooth movement-an update', *Journal of clinical and diagnostic research: JCDR*, 9(4), pp. ZE01–5. doi: 10.7860/JCDR/2015/11162.5769.
- [15] Melsen, B., Stensgaard, K. and Pedersen, J. (1979) 'Sucking habits and their influence on swallowing pattern and prevalence of malocclusion', *European journal of orthodontics*, 1(4), pp. 271–280. doi: 10.1093/ejo/1.4.271.
- [16] Oropeza, L. M. et al. (2014) 'Prevalence of malocclusions associated with pernicious oral habits in a Mexican sample', *Revista Mexicana de Ortodoncia*, 2(4), pp. 220–227. Available at: <https://www.medigraphic.com/cgi-bin/new/resumenI.cgi?IDARTICULO=52835>.
- [17] Pandian, K. S., Krishnan, S. and Kumar, S. A. (2018) 'Angular photogrammetric analysis of the soft-tissue facial profile of Indian adults', *Indian journal of dental research: official publication of Indian Society for Dental Research*, 29(2), pp. 137–143. doi: 10.4103/ijdr.IJDR_496_16.
- [18] Ramesh Kumar, K. R. et al. (2011) 'Depth of resin penetration into enamel with 3 types of enamel conditioning methods: A confocal microscopic study', *American journal of orthodontics and dentofacial orthopedics: official publication of the American Association of Orthodontists, its constituent societies, and the American Board of Orthodontics*, 140(4), pp. 479–485. doi: 10.1016/j.ajodo.2010.10.022.

- [19] Restrepo, G. A. U. (2010) *Fundamentos de odontología: Ortodoncia, teoría y clínica*. CIB (Corporacion para Investigaciones Biologicas). Available at: <https://play.google.com/store/books/details?id=r741MwEACAAJ>.
- [20] Rubika, J., Felicita, A. S. and Sivambiga, V. (2015) 'Gonial angle as an indicator for the prediction of growth pattern', *World J Dent*, 6(3), pp. 161–163.
- [21] Samantha, C. et al. (2017) 'Comparative Evaluation of Two Bis-GMA Based Orthodontic Bonding Adhesives - A Randomized Clinical Trial', *Journal of clinical and diagnostic research: JCDR*, 11(4), pp. ZC40–ZC44. doi: 10.7860/JCDR/2017/16716.9665.
- [22] Sayin, M. O. et al. (2006) 'Initial effects of the tongue crib on tongue movements during deglutition: a Cine-Magnetic resonance imaging study', *The Angle orthodontist*, 76(3), pp. 400–405. doi: 10.1043/0003-3219(2006)076[0400:IEOTTC]2.0.CO;2.
- [23] Sb, F. (1998) 'Clinical pedodontics'. Philadelphia: Saunders.
- [24] Schwestka-Polly, R., Engelke, W. and Hoch, G. (1995) 'Electromagnetic articulography as a method for detecting the influence of spikes on tongue movement', *European journal of orthodontics*, 17(5), pp. 411–417. doi: 10.1093/ejo/17.5.411.
- [25] Shahraki, N., Yassaei, S. and Moghadam, M. G. (2012) 'Abnormal oral habits: A review', *Journal of dentistry and oral hygiene. Academic Journals*, 4(2), pp. 12–15. Available at: <https://academicjournals.org/journal/jdoh/article-abstract/c0c201f5216>.
- [26] Shetty, S. R. and Munshi, A. K. (1998) 'Oral habits in children--a prevalence study', *Journal of the Indian Society of Pedodontics and Preventive Dentistry*, 16(2), pp. 61–66. Available at: <https://www.ncbi.nlm.nih.gov/pubmed/11813757>.
- [27] Sivamurthy, G. and Sundari, S. (2016) 'Stress distribution patterns at mini-implant site during retraction and intrusion--a three-dimensional finite element study', *Progress in orthodontics*, 17, p. 4. doi: 10.1186/s40510-016-0117-1.
- [28] Taslan, S., Biren, S. and Ceylanoglu, C. (2010) 'Tongue pressure changes before, during and after crib appliance therapy', *The Angle orthodontist*, 80(3), pp. 533–539. doi: 10.2319/070209-370.1.
- [29] Vikram, N. R. et al. (2017) 'Ball Headed Mini Implant', *Journal of clinical and diagnostic research: JCDR*, 11(1), pp. ZL02–ZL03. doi: 10.7860/JCDR/2017/24358.9240.
- [30] Villa, N. L. and Cisneros, G. J. (1997) 'Changes in the dentition secondary to palatal crib therapy in digit-suckers: a preliminary study', *Pediatric dentistry*, 19(5), pp. 323–326. Available at: <https://www.ncbi.nlm.nih.gov/pubmed/9260225>.
- [31] Vishnoi, P. et al. (2017) 'Age-wise and gender-wise prevalence of oral habits in 7–16-year-old school children of Mewar ethnicity, India', *Indian Journal of Dental Sciences . Medknow Publications and Media Pvt. Ltd.*, 9(3), p. 184. doi: 10.4103/IJDS.IJDS_33_17.
- [32] Viswanath, A. et al. (2015) 'Obstructive sleep apnea: awakening the hidden truth', *Nigerian journal of clinical practice*, 18(1), pp. 1–7. doi: 10.4103/1119-3077.146964.
- [33] Warren, J. J. et al. (2001) 'Effects of oral habits' duration on dental characteristics in the primary dentition', *Journal of the American Dental Association*, 132(12), pp. 1685–93; quiz 1726. doi: 10.14219/jada.archive.2001.0121.

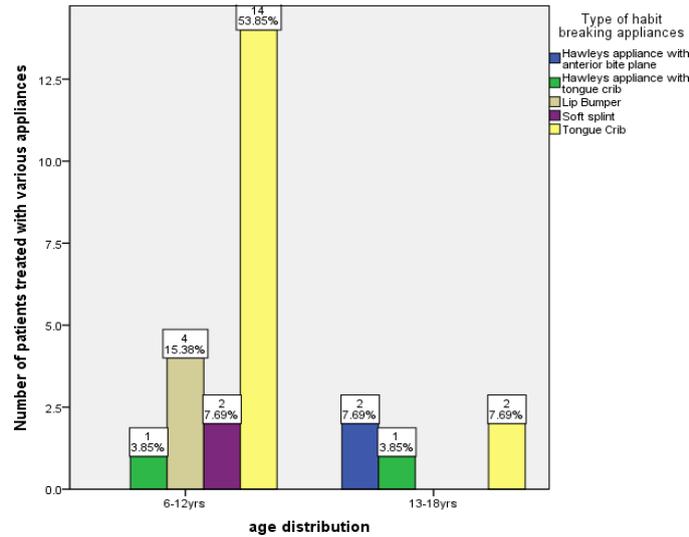


Figure 1: Bar chart depicts the association between habit breaking appliances and different age groups. X axis denotes age distribution, Y axis denotes number of patients treated with various appliances. Chi square test was done and was statistically significant. (Pearson Chi Square=11.514, P value=0.021(< 0.05)) All types of habit breaking appliances were commonly advised in the 6-12yrs age group than 13-18 yrs age groups. Commonly used appliances in the 6-12 years age group was tongue crib(yellow) whereas in the 13-18 years age group, tongue crib(yellow) and hawley's appliance with anterior bite plane (blue) was used.

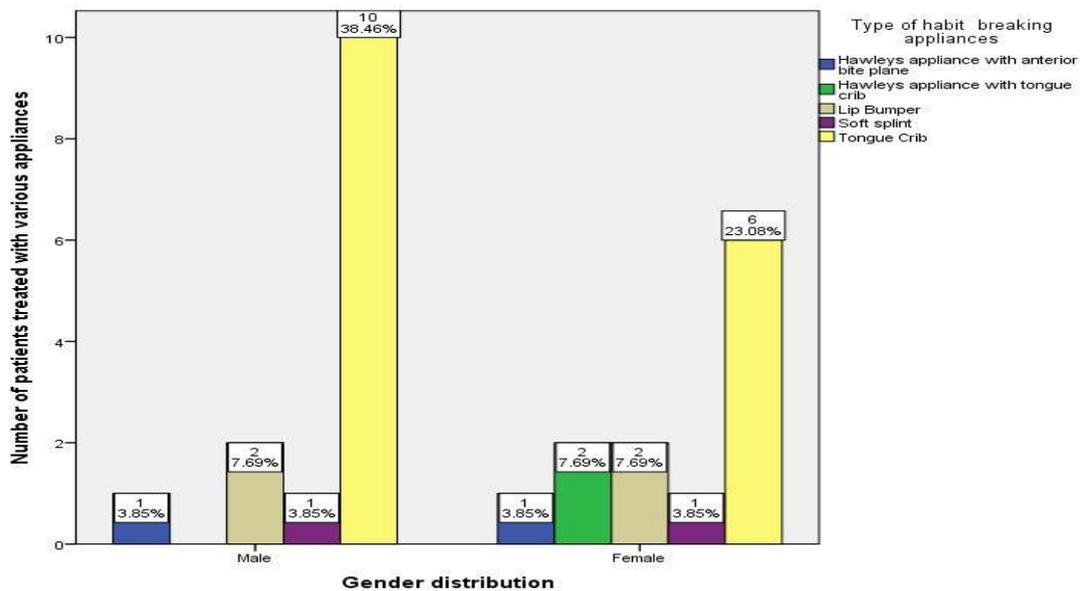


Figure 2: Bar chart depicts the association between type of habit breaking appliances and gender. X axis represents gender distribution, Y axis represents number of patients treated with various appliances. Chi Square test was done and was found to be statistically not significant (Pearson Chi square=2.863, P value=0.581(>0.05)). Tongue crib(yellow) was the most commonly used habit breaking appliance in males and females.