

Vestibular Screen - A Preorthodontic Treatment for Mouth Breathing Habit

¹Dr. Katherina Sushmita Barman P.J , Post graduate student, Department of Paediatric and Preventive Dentistry, Mahe Institute of Dental Science and Hospital, Mahe

²Dr. Rena Ephraim, Professor and head of Department, Department of Paediatric and Preventive Dentistry, Mahe Institute of Dental Science and Hospital, Mahe

³Dr. Rajamani, Professor, Department of Paediatric and Preventive Dentistry, Mahe Institute of Dental Science and Hospital, Mahe

⁴Dr. Sharath Chandrashekhar, Senior Lecturer, Department of Paediatric and Preventive Dentistry, Mahe Institute of Dental Science and Hospital, Mahe

Corresponding Author: Dr. Katherina Sushmita Barman P.J , Post graduate student, Department of Paediatric and Preventive Dentistry, Mahe Institute of Dental Science and Hospital, Mahe

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Abstract

Introduction: Increase in the incidence of malocclusion due to mouth breathing habit is also on the rise. Research has found that mouth breathing habit affects mostly children aged 7 - 12 years. In the vast majority of studies, the authors established a relation between mouth breathing and the development of maxillo-facial region and occlusion. These clinical conditions become more complicated in the late-mixed and permanent dentition if mouth breathing continues to persist. The effect of mouth breathing such as incompetent upper lip, gummy smile and everted lower lip with hyperactive mentalis activity should be corrected at an early age to prevent the

development of a class I with proclination or a class II Div I situation. Poor performance, lack of confidence in school and many systemic effects on the head and neck and body of a mouth breather are some of the other effects of the habit in children. Often parents complain that the oral screen appliance is not accepted well by the children, especially those with severe mouth breathing habit. **Materials And Method:** Two children, aged 8 and 9 years, reported to the department of Pediatric and Preventive Dentistry with class I malocclusion and severe proclination, diastema and short upper lip. They were both diagnosed as habitual mouth breathers. Treatment was

planned with breathing exercises and lip exercises, along with the use of a vestibular screen.

Result: Exercises followed by use of vestibular screen brought about considerable change in the oral and perioral musculature along with decrease in the overjet and overbite and correction of lip posture by the end of the treatment. The psychological impact on these children reduced considerably in way of their self-confidence and improved their alertness.

Conclusion: It is paramount that mouth breathers be recognized early. The treatment of mouth breathers should be carried out at the earliest, to stop the habit through exercises and vestibular screen therapy to intervene the dentofacial changes which are inevitable with the continuation of this habit.

Keywords: Vestibular screen, Mouth breathing, Psychological impact, Mixed dentition, Proclined teeth, diastema, short upper lip.

Introduction

Malocclusions developing due to mouth breathing habit is on the increase in children, many of which go without early recognition and intervention. Proclined anteriors with diastema, short upper lip and open mouth posture causes a large physiological and psychological impact on the young school going children.¹⁻⁴

Literature review demonstrated that mouth breathing habit affects mostly children aged 7 - 12 years. In the vast majority of studies,^{5,6,7} the authors established a relation between mouth breathing and the development of maxillo-facial region and occlusion. These clinical conditions become more complicated in the late-mixed and permanent dentition if mouth breathing continues to persist.⁸ The effect of mouth breathing such as incompetent upper lip, gummy smile and everted lower lip with hyperactive mentalis activity should be corrected at an early age to prevent the development of a class I with

proclination or a class II Div I situation. Developed Class II Div I in conjunction with a probable maxillary excess and/or a mandibular deficiency calls for two stage corrective treatment with twin block therapy and/or head gear therapy. The treatment thus started is long and tedious and requires several dental visits and radiographs, suffer longer impact of psychological and physiological difficulty, followed by fixed appliance therapy.⁹ Early recognition of the habit, its etiology and correction is of utmost importance, as the treatment of the developed class II occlusion or the gummy smile is only a compromise with orthodontic treatment at a later age. The other physical malformation and medical conditions mouth breathing can cause remains a reminder to the health community to collectively recognize and intervene the habit in children, at the earliest.

Oral screen has been recommended for treating mouth breathing habit, from many years. Many a time, parents complain that the appliance is not well accepted by the children, especially those with severe mouth breathing habit. The purpose of this article is to emphasize on the importance of early correction of the mouth breathing habit and prevent permanent deleterious effects to the physical, psychological and craniofacial structures in children.

Materials And Method

In our case report, we chose two children in the age of 8 and 9 years who reported to the department of Pedodontics and Preventive Dentistry, Mahe, with a complaint of malalignment in the mixed dentition period. These children reported with a chief complaint of open mouth posture after the eruption of the maxillary permanent anterior teeth, recurrent attacks of cold, ridicule from peers, at school and play, due to unaesthetic appearance, and lack of confidence. Parents, of these children, gave a history of the child tossing and turning

restlessly in bed during the night. On examination both these patients had a partially patent airway, were free from any systemic diseases, physical or mental. These children were examined and were sent for nasopharyngeal examination to rule out presence of enlarged adenoids, tonsils or other pathology. The children were healthy and nourished. One Child had end-on permanent molar relationship, and the other child had a class I molar relationship. These patients were confirmed as habitual mouth breathers. In both these patients however the nasal turbinates of at least one nostril was enlarged and patency partially reduced. Both the patients chosen had short upper lip exposing the labial aspect of the maxillary incisors to more than 5mm from the incisal edge, lip trap, increased overjet of more than 5mm, deepbite, everted and fleshy lower lip, and deepened mentolabial sulcus. On forceful closure of the lips the mentalis muscle showed hyperactivity and the children were unable to keep mouth closed for long periods.

The parents of these children were appraised of the treatment plan and their consent sought for the same. The children were given instructions for active breathing exercises and lip exercises for a period of three weeks which greatly increased the ease of breathing through the nose.^{10,11} The nasal turbinates seemed to shrink in size after the water holding exercise, thus increasing the patency of the nares. At the next appointment, upper and lower impressions of the teeth were made with alginate. The casts were prepared, occluded and fixed into position with plaster of Paris for the preparation of a vestibular screen. Waxed spacers were placed to relieve and provide space for mild dental changes (Fig: 1). Using the rest of the conventional method the vestibular screen was prepared to extend to the vestibular sulcus on all sides.¹² Hotz modification was done on the vestibular screens to aid with exercises. Children were then made to wear the

appliance one hour before going to bed, to familiarize themselves with the appliance, and continued throughout the night. Since the proclination was severe in these children we incorporated buttons on the appliance in relation to the proclined maxillary anteriors, to allow the acrylic to touch the proclined incisors. The patients were also instructed to continue breathing exercises and additional lip exercises with the appliance, once daily for 20 minutes, under the supervision of the parent. The patients were recalled periodically every 4-6 weeks to reinforce the exercise and appliance wear and to monitor the progress.

Result

Over a period of 3-6 months there was considerable reduction in the proclination of the maxillary incisors and the diastema, and the lip trap and overjet also reduced and increased the lip coverage on the maxillary incisors. (Fig 3 and 5) This seemed to bring a positive change in the physiological and psychological aspect on the child along with reduction of open mouth posture and mouth breathing. The mentalis activity was reduced and the lower lip attained a less everted and firm posture. Since the proclination was severe in both these children, of 6-8mm overjet, the height of the button was increased once again during the periodic visit to further retrocline the proclined maxillary incisors. The treatment was continued over a period of 1-1.5 years, with emphasis on daily exercise of the lip and breathing exercise, to completely eliminate the habit and to revert back all the effects of mouth breathing.



Fig: 1: Fabrication of vestibular screen wax pattern with a window created on the middle third of 22,21,11,12

Case 1:

Pre - OP



Figure: 2

Post - OP



Figure : 3

Case 2

Pre - OP



Figure 4

Post- OP



Figure 5

Discussion

Mouth breathing has been seen to have deleterious effects on the oral and perioral structures besides causing other deleterious effects on the whole body.¹³ Proclination with diastema, open mouth posture and retruded mandible and everted lips can affect the confidence, academic performance and personality of the child and has great significance in the life of a child.^{14,15} These effects should be reverted back to its original position as early as possible. It is essential that such changes are reverted back to prevent permanent damage to oral and perioral structures, which can bring about permanent developmental abnormality to the craniofacial region.¹⁶

According to a study by Paolantonio, nearly 38% in 1616 sample of children aged 3 to 6 years needed orthodontic treatment and 46% had early signs of malocclusion of less severe degree that require a close monitoring and the elimination of risk factors so they could improve spontaneously with growth. Also the prevalence of bad habits and oral breathing increases with increasing severity of the malocclusion, and sucking habits and oral breathing are both closely related to anterior open bite, posterior crossbite and increased overjet.¹⁷

Our effort of such a treatment regimen at an early stage of mixed dentition was seen to greatly reduce the duration of treatment and bring about more favorable results of skeletal growth in these children. The listless or vacant look on the faces of these children during and after

treatment was appreciable. (fig: 2,4 and fig: 3,5) This is mainly due to the decrease of oxygen saturation in the blood of mouth breathers and due to restless sleep during the night.^{18,19} The acrylic buttons were given on the inner aspect of the oral screen so as to retrocline the maxillary incisors. This eases the difficulty of keeping the lips closed at all times. The relief with wax spacer during the fabrication of the vestibular screen was done so as to keep the cheek away and enable the narrow maxillary and mandibular arches to correct itself during the treatment. Periodic recall of the patient was absolutely necessary to emphasize on the lip and breathing exercise, and to view the progress of the treatment. Studies have shown that the psychological effect of malocclusion is profound in children with increased overjet and diastema.^{19,20} In our study also we found that these children showed increased confidence during their subsequent visits.

Conclusion

Mouth breathing can cause considerable damage to the craniofacial structures during the developmental stage in a child. The overall physical, dentofacial and psychological effects it has on the child has been well documented. These effects should be prevented or intervened at the earliest by the recognition and treatment of the habit with breathing exercises, lip exercises and vestibular screen therapy. This helps in reducing the treatment time, cost of the treatment, and prevent systemic effects of the habit later into life.

References

1. Bresolin D, Shapiro GG, Shapiro PA, Dassel SW, Furukawa CT, Pierson WE, et al. Facial characteristics of children who breathe through the mouth. *Pediatrics*. 1984;73:622–625.
2. McNamara JA. Influence of respiratory pattern on craniofacial growth. *Angle Orthod*. 1981;51:269–300.
3. Behlfelt K. Enlarged tonsils and the effect of tonsillectomy. Characteristics of the dentition and facial skeleton. Posture of the head, hyoid bone and tongue. Mode of breathing. *Swed Dent J Suppl*. 1990;72:1–35.
4. Jefferson Y. Mouth breathing: adverse effects on facial growth, health, academics, and behavior. *Gen Dent*. 2010;58:18–25.
5. Kikuchi Y. Three-dimensional relationship between pharyngeal airway and maxillo-facial morphology. *The Bulletin of Tokyo Dental College*. 2008;49(2):65–75.
6. Luzzi V, Ierardo G, Viscogliosi A, Fabbrizi M, Consoli G, Voza I, Vestri A, Polimeni A. Allergic rhinitis as a possible risk factor for malocclusion: a case–control study in children. *International Journal of Paediatric Dentistry*. 2013 Jul;23(4):274-8.
7. CISTULLI PA. Craniofacial abnormalities in obstructive sleep apnoea: implications for treatment. *Respirology*. 1996 Sep;1(3):167-74.
8. Valcheva Z, Arnautska H, Dimova M, Ivanova G, Atanasova I. The role of mouth breathing on dentition development and formation. *Journal of IMAB–Annual Proceeding Scientific Papers*. 2018 Jan 18;24(1):1878-82.
9. Singh G. *Textbook of Orthodontics*. 2nd ed. Chapter 49-oral habits and their management, p. 581-612.
10. Tandon S. *Textbook of Pedodontics*. 2nd ed. Chapter 39: Commonly Occurring Oral Habits in Children and their Management, p. 492-526.
11. Thuer, U., & Ingervall, B. (1990). Effect of muscle exercise with an oral screen on lip function. *The European Journal of Orthodontics*, 12(2), 198–208. doi:10.1093/ejo/12.2.198

12. Jefferson Y. Mouth breathing: adverse effects on facial growth, health, academics and behaviour. *General dentist*. 2010 Jan- Feb; 58 (1): 18-25
13. Paul JL, Nanda RS. Effect of mouth breathing on dental occlusion. *Angle Orthod* 1973;43(2):201-206.
14. Stokes N, Della MD. A student research review of the mouth breathing habit: discussing measurement methods, manifestations and treatment of the mouth breathing habit. *Probe* 1996;30(6):212-214.
15. Jefferson Y. Mouth breathing: adverse effects on facial growth, health, academics and behaviour. *General dentist*. 2010 Jan- Feb; 58 (1): 18-25.
16. Paolantonio EG, Ludovici N, Saccomanno S, La Torre G, Grippaudo C. Association between oral habits, mouth breathing and malocclusion in Italian preschoolers. *Eur J Paediatric Dent*. 2019 Sep;20(3):204-208.
17. Olsen KD, Kern EB, Westbrook PR. Sleep and breathing disturbance secondary to nasal obstruction. *Otolaryngol Head Neck Surg* 1981; 89(5):804-810.
18. Meurice JC, Marc I, Carrier G, Series F. Effects of mouth opening on upper airway collapsibility in normal sleeping subjects. *Am J Respir Crit Care Med* 1996;153(1):255-259.
19. Finn, Sim JM, Finn SB. *Clinical Pedodontics oral habits in children* Ch. 17. 4th ed. p. 370-385.
20. Jain A, Bhaskar DJ, Gupta DA. *Adverse oral habits: potential harm to dentition*. Lap Lambert Academic Publishing, 2013.