

Separation Anxiety—An Unseen Cause for Development of Abnormal Oral and Paraoral Habits and Malocclusion: A Review of Literature and Report of Two Cases

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ABSTRACT

A child's overall well-being depends on its mutual relationship with the caregiver and social environment. Its attachment with the caregiver forms an emotional bond at six months to two years of age. Separation anxiety refers to fear of separation from the attachment figure. In some neglected children in early age of attachment formation, symptoms of separation anxiety persist and they may show debilitating nervous behaviors during growth. It thus becomes an unseen cause of psychological problem and development of abnormal oral habits occlusal dysfunctions and further psychological problems. Oral habits being learnt patterns of muscle contraction are displayed for release of mental tension due to fear and anxiety often associated with anger, hunger, sleep, tooth eruption and fear. Pediatric dentist plays an important role in patient education through anticipatory guidance. Proper diagnosis and early interception of oral habits as a result of separation anxiety disorder can prevent occlusal disturbances in children. The present paper includes review of literature along with the management of two cases of separation anxiety as an unseen cause of development of unique socially unacceptable abnormal oral and paraoral habits and resultant malocclusion.

Keywords: Habits, Malocclusion, Separation anxiety.

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INTRODUCTION

Separation anxiety refers to excessive fear about separation from an attachment figure. It is a developmentally appropriate reaction of distress to separation of the caregiver during infancy and is crucial to the child's psychological development.¹ In some neglected children in early age of attachment formation, symptoms of separation anxiety persist and they may show debilitating nervous behaviors during growth. It thus becomes an unseen cause of psychological problem and development of abnormal oral habits occlusal dysfunctions and further psychological problems.² Early separation has been clearly linked to insecure attachment and concomitant mental health problems. It is mostly related to attachment loss.³ If the separation period is extended for more than a month before age five, the child will show definite symptoms of personality disorder in adolescence and adulthood.⁴ If not controlled by responsive parenting it may culminate into separation anxiety disorder.⁵ Behavioral problems result from anxious reactions. Many times child may get indulged into obsessive compulsive behavior that emerge abnormal nervous habits like trichotillomania. Child may also develop abnormal oral and paraoral habits leading to malocclusion. Oral habits are learned patterns of muscle contraction with a very complex nature. They are often associated with anger, hunger, sleep, tooth eruption and fear. Sometimes oral habits are displayed for release of mental tension. These can be non-nutritive sucking like thumb, finger, pacifier and/or tongue, lip biting, and bruxism and result in damage of dentoalveolar structures. The present article reports two such cases of children affected by separation anxiety and subsequent development of unique combination of abnormal nervous habits of excoriation and trichotillomania with oral habits and their effects on developing malocclusion. The abnormal oral habits are successfully managed with appropriate treatment plan (Fig. 1).

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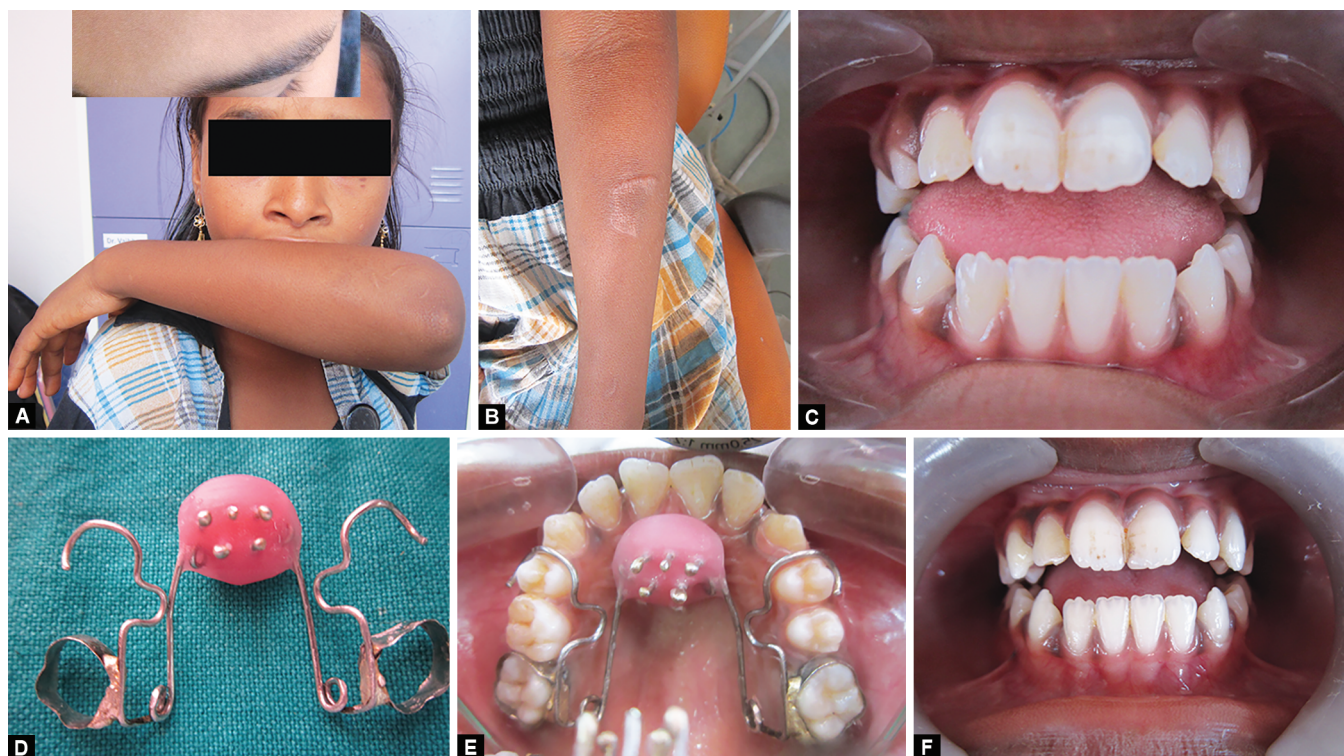
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REVIEW OF SEPARATION ANXIETY AND DEVELOPMENT OF ABNORMAL ORAL HABITS

Child Birth and Parenting

Arrival of a new baby brings joy and a sense of responsibility on parents. A child's birth starts a life-long process of mutual adaptation between the child, caregivers and social environment and their relationship affects physical, mental, and emotional well-being of child. In today's changing concept of happy life



Figs 1A to F: (A) Hand-sucking habit; (B) Scar mark on forearm; (C) Open bite with tongue thrust; (D) Fixed modified habit-breaking appliance with Quad-helix; (E) Intraoral view of fixed modified habit breaking appliance with Quad-helix; (F) Reduced open bite after habit breaking; (G) Mamelons present on axillary and mandibular anterior teeth

working women in nuclear families continue to work till childbirth and stay away from their family.⁶

Attachment Theory

Attachment is an emotional bond. Bowlby^{8,9} in his 'attachment theory' stated that, in strong disposal of child to proximity and contact of a specific person in certain frightening, tired and ill situations, the child gets attached to that figure. This attachment relationship forming an emotional bond remains from about six months to two years of age between infants and responsive caregivers (mainly the mother). This bond also provides security to child and decreases with increased growth and mobility of the child. Ainsworth et al. found that infants have four types of attachments namely secure, avoidant, ambivalent and resistant attachments.⁷ Later added a fourth category, termed disorganized attachment to Ainsworth's original classification. Bowlby⁶ acknowledged that besides feeding and shelter, infants also need emotional support and contact. This "attachment parenting" is traditionally practiced by mothers through long-term breastfeeding, baby wearing, and co sleeping.⁷ Responsive mothers are affectionate and aware about their children's timely needs to provide proper physical care.

PSYCHOLOGICAL/EMOTIONAL DEVELOPMENT OF CHILD

From birth to adolescence infant goes through series of changes in an orderly sequence for complete physical, cognitive, and emotional development. These changes are age related and take place in a predictable pattern. Emotional and social developments are closely interrelated growth patterns and start with realization of

self-concept and self-esteem. Learning to trust and development of affection to others is an important part of social-emotional development. The relationship of a child to a trusting and caring adult forms basic foundation personality development of child. When a child has been neglected, rejected, and does not feel secure, he has a difficulty in developing skills to socialize with others.¹⁰ Infants begin to show fear, anger, and anxiety between six and nine months of age. By the end of the second year, children develop many other ways to express their emotions (Fig. 2).

Attachment Behaviors in Child

Attachment, an emotional bond between the infant and a care giver begins early in life. Infants show various early attachment behaviors like cooing, kicking, gurgling, smiling, and laughing. Through these infants reveal their response and care for their people. If infants are cared for by an unfamiliar person they show anxiety. They may also show distress signs such as irregular sleeping or eating patterns.

Separation anxiety is attachment behavior of infants. When child is left alone by familiar caregiver it becomes unhappy and shows distress which is mostly expressed by crying. The first signs of separation anxiety appear at about six months of age and are more clearly seen by nine months of age. Separation anxiety is very strong by 15 months of age and then gradually weakens. This is normal phenomenon and is called as Developmental Separation anxiety (DSA).¹⁰ Here baby begins to cry for no apparent reason until reunited with the mother. Developmentally both separation anxiety and stranger anxiety appear at the age of two years. At this age children develop linguistic skills and start social interaction with other children and thus they gain independence from their parents.

Attachment appears to have an important role in the loss of DSA. Separation anxiety is considered a normal part of



Figs 2A to F: (A) Thumb-sucking and hair-pulling habit; (B) Alopecic patch on the left side of skull; (C) Alopecic patches; (D) Regrowth of hair on previous alopecic patches after correction of hair-pulling habit; (E) High arched palate with anterior open bite; (F) Removable habit-breaking appliance for correction of thumb-sucking

development It is the period of interaction between child and mother during which the psychic structure is formed.¹¹ According to Erikson's psychosocial theory these children are in the stage of trust versus mistrust which is the most important issue with separation anxiety.

EFFECT OF EARLY SEPARATION OF CHILD FROM MOTHER

Physical availability of attachment figure is an important factor in development of secure attachment with child that is commonly appraised by child. Whether it is a mother or secondary care giver, it should be physically accessible to the child as and when required. According to Bowlby this lack of accessibility may be through separation or loss. It can be temporary or permanent in nature.¹² Besides physical accessibility, Ainsworth¹³ clarified that development of certain beliefs in child's mind about the positive response of care giver and their anticipation are other important aspects of for infant attachment. During first two years of life maternal availability is more important due to infant's limited understanding.

By the third or fourth year of life, with child's proper understanding about motives and plans of care giver, their relationship develops

into a "goal-corrected partnership"⁶ and separation anxiety typically starts declining.^{14,15} It has been indicated by research and clinical samples that early separation from caregivers can have adverse effects on children's well-being.^{6,16-18} The children reared in institutions with devoid interaction with warm and responsible adults may show problems in socioemotional development.¹⁹ So also children raised up with unfamiliar care givers are maltreated and may show severe behavioral problems than children with constantly associated parents.

Early separation has been clearly linked to insecure/disorganized attachment and concomitant mental health problems. This insecure attachment is mostly related to temporary or permanent attachment loss.³ If the separation period is extended for more than a month before age five child will show definite symptoms of personality disorder in adolescence and adulthood.⁴ Leventhal and Brooks-Gunn²⁰ found that separation from a primary caregiver had a negative impact on reading ability and achievement of child at eight years of age. However, this stress can be relieved or lessen by responsive parenting.²¹

Attachment Disorders

Attachment disorders are complex pattern of abnormal behaviors and other behavioral anomalies resulting from social neglect and

parental deprivation. It cannot be done before 9-10 months age because child starts making selective attachment at this age. These are clinically divided as inhibited (emotionally withdrawn) and disinhibited type (indiscriminately social).^{22,23} In the emotionally withdrawn/inhibited type, the child will be nervous and show limited or no response to social interaction with care giver and abnormal social behavior. However, disinherited type of child will behave to be an extra familiar with strangers. As the child grows he/she will become intrusive, over smart and overindulgent with strangers. These children may violate their personal space, or may get indulged in physical contact without hesitation which may be detrimental to normal personal development.

SEPARATION ANXIETY AND ITS EFFECTS ON PERSONALITY OF GROWING CHILDREN

Although separation anxiety is considered a normative phenomenon in early childhood (DSA) however if not controlled by responsive parenting it may culminate into separation anxiety disorder (SAD) in adulthood. SAD is the most commonly diagnosed childhood anxiety disorder requiring mental health treatment. It will have negative impact on child's social and emotional functioning.

Children with SAD are fearful about the possibility of imaginary disastrous things on their separation from an attachment figure. This might lead the child to avoid participation in developmentally appropriate activities with peers. In extreme cases SAD may result in school refusal and a disrupted educational attainment.⁵ It may lead to short-term problems like declined academic performance, detachment from peers and family conflict.²⁴ Affected children may also exhibit certain somatic symptoms like stomach-aches, headaches and nausea. Somatic complaints often occur in the context of separation situations reflecting as an avoidance strategy or actual physical distress.^{25,26} Additionally children may experience sleep difficulties in absence of.²⁷ They also experience nightmares about separation potentially disrupting sleep. Childhood is associated with a heightened risk for the development of other anxiety and depressive disorders in adolescence and adulthood, such as panic disorder and agoraphobia.^{28,29}

Effects of Separation Anxiety on Family

One affected child in a family by separation anxiety affects overall family.²⁶ It may result in parental stress as child's anxiety limits the activities of siblings and parents.³⁰ These accommodations can lead to distress among all family members. Parents become frustrated while siblings may dislike the extra attention being paid to the symptomatic child. Commonly a close bond is developed between the SAD child and primary caregiver mostly the mother. This can lead to family dysfunction exclude father from the primary caring and sharing.³¹

Separation Anxiety and Nervous Habits

It is now understood that chronic, extreme anxious reactions if left without intervention have serious consequences on mental health of the child.³² The anxious feelings and resultant physical discomfort, are confusing and fear producing for the children. Their mind produces a fight-or-flight physical response that can be calmed by responsive parenting. However, when parental support is lacking, the fight or flight messages are repeatedly inundated through neurological process on child's mind. It results in child's externalized raging, selective mutism, obsessive compulsive behaviors, or panic attacks from the anxiety disorder. All these

reactions occur with the unconscious goal of avoiding the anxiety or coping with the anxiety. Child may get indulged into obsessive compulsive behavior and through these develops abnormal nervous habits. They include hoarding disorder, trichotillomania, excoriation, body-focused repetitive behavior disorder and olfactory reference syndrome. Besides these child may develop abnormal oral and paraoral habits leading to malocclusion. The present article reports two such cases of children affected by separation anxiety and subsequent development of unique combination of abnormal nervous and oral habits and their effects on developing malocclusion. The abnormal oral habits are successfully managed with appropriate treatment plan.

CASE REPORTS

Case 1: Eleven years old female child patient was presented to department of pedodontics by her mother with a chief complaint of open mouth, inability to contact upper and lower front teeth, and unusual habit of constant sucking the skin of hand/forearm since eight years (Fig. 1A). The mother was worried about her unusual habit. History revealed that the child was from a lower socioeconomic group and both the parents were laborers. Specifically there was history of separation of patient from mother in infancy at nine months of age due to early birth of sibling. This was accompanied by parental negligence and bottle feeding in childhood. Mother also gave a history of household remedies used for the habit breaking. There was also a history of child abuse by the mother through harsh deliberate burning of patients hand and constant nagging in an attempt to relive patient from the socially unacceptable habit. The patient had a brother nine months younger to her. The history revealed the early birth of her sibling at nine months of her age and the patient was left at the care of her grandmother. The nine months old patient used to sleep sucking her forearm and was reluctant to come closer to her grandmother. Since then the habit continued till date with associate tongue-trusting habit with a frequency of average 10–12 hours a day. Meanwhile with all good intention to get rid of this socially unacceptable habit mother attempted to abuse the child at seven years of age by injuring the child's forearm by burning. However after healing the burn wound the patient became arrogant and more indulged in the habit. Prenatal history was not contributory. Postnatally patient was breastfed till eight months of age and thereafter was bottle fed. Duration of bottle feeding was till two years with frequency of 3–4 times a day.

On general examination, the patient had average built with dolichocephalic convex facial profile. Facial divergence was posterior with incompetent lips. Anterior open bite of 7 mm, adenoid face and a scar mark of left forearm were seen extra orally. Intraoral examination revealed severe tongue-thrusting habit, anterior open bite, and mixed dentition stage with oronasal respiration and normal mastication, speech, and temporomandibular activity. There was abnormal perioral lip activity where lips indulged in forceful sucking of forearm. Mamelons were present on upper and lower anterior teeth (Fig. 1G). The patient was diagnosed to have compulsive, empty, harmful, pressure, nonnutritive hand sucking habit and secondary tongue thrust habit with resultant open bite. A treatment plan was made with definite objectives of habit breaking, correction of open bite, arch expansion, and correction of proclination and derotation of molars.

It was achieved through psychological counseling of parents, psychological therapy of patient, talk therapy, and play therapy.

Patient and parent education was done regarding the effects of habit on occlusion and esthetics. The patient and parents were also educated and motivated for tongue exercises, removable habit breaking appliance. The habit was successfully broken with fixed modified habit breaking appliance with Quad-helix (Figs 1D and E). Later the patient was advised corrective orthodontic mechanotherapy (Fig. 1F).

Case 2: A ten years old boy was brought by his parents for the treatment of malaligned teeth and correction of socially unacceptable habits of unique association of simultaneous thumb sucking and hair pulling (trichilomania). Detailed case history retrieved from the parents revealed patients constant engagement with uniquely associated habits of simultaneous thumb sucking and hair pulling (Fig. 2A). Patient having the working mother and the child was left at the care of an old lady since his infancy to childhood from six months to six years of his age. Till six years of age patient's physical and psychological growth was normal; however, after the death of patients old care taker patient became highly anxious and got engaged with the unique association of the habits of simultaneous thumb sucking and hair pulling. Parents noticed that when patient's thumb was in mouth, at the same time he used to roll a bunch of his hair and pull it along. The patient's school performance was also declined after the loss of care taker. The habit was realized when mother noticed an alopecic patch on the left side of skull (Fig. 2B and C). This was followed by constant nagging to leave the unwanted habits. It further worsened the conditions resulting in stubborn and arrogant behavior of patient. So parents reported to dental clinic for treatment of habits and malocclusion. Patient's facial profile was convex. Intraorally high arched palate and anterior open bite were noticed. General examination showed the alopecic patch on left side of temporal region of scalp.

In first phase psychological counseling was done and followed and study models were prepared. The second phase of treatment consisted of removable habit breaking appliance and wearing a tight surgeon's cap to get rid of the hair pulling habits. The patient was also advised to get engaged in outdoor sports as a means of distraction and for physical wellbeing.

DISCUSSION

A habit is an automatically done repetitive act. Oral habits can be divided into two groups namely acquired and compulsive. Acquired oral habits are the learned behaviors which could be easily stopped. Children can give up these behaviors with growth and may adapt another one. However compulsive habits are the fixed behaviors that are adapted by child due to intolerable emotional pressures. Non-nutritive sucking exhibit normal pattern of oral habits that are developed in infancy and are considered to be normal till three years of age. Apart from these, many abnormal paraoral habits are reported in literature in developing children with psychosocial causative factors mainly related to adverse childhood experiences (ACEs). These are often categorized as compulsive oral habits. The child feels safety with this habit and preventing the child from these habits build him or her anxious and disquieted. Such habits include nail biting, bruxism, hair pulling/trichotillomania, lip sucking or lip biting, arm sucking, toe sucking, hoarding disorder, excoriation, body-focused repetitive behavior disorder, etc.³³ Repetitive behaviors are common in infancy and most of them, like sucking reflex are started and finished spontaneously.³⁴ Foremost common of these repetitive

behaviors is hand sucking. 89% of infants develop it in second month while 100% of them by first year of age³⁴ as the mouth is the primary and permanent location for expression of emotions. Sucking also proves to be a source of relief in passion and anxiety in both children and adults.^{35,36}

ACEs may result in mental stress leading to development of various psychoneurotic oral habits causing malocclusion and inferior esthetics to further affect the psyche of developing child. ACEs prolong these natural reflex habits beyond their stipulated age and are recognized as non-nutritive sucking, finger-sucking, tongue thrust swallow which prove to be the most common factors influencing dental development and potential facial growth in childhood. The link between oral habits and unfavorable dental and facial development is associational rather than purely cause and effect.³⁷⁻³⁹

Pedodontists have an important role in improving child's dental health from age zero to thirteen through prevention and treatment of all oral maladies as well as developing malocclusion. Early dental visits allow anticipatory guidance to help children to stop sucking habits by age three years or younger. Beyond three years, non-nutritive sucking is implicated in malocclusions, such as anterior open bite, posterior cross bite, and Class II molar relationship. Also, tongue-thrusting and an abnormal tongue position may be associated with anterior open bite, speech difficulties, excessive mandibular growth and anterior protrusion of upper incisors.^{40,41}

These patients need monitoring to prevent developing malocclusion.

Prevention of ACEs is also a part of pediatric dental treatment with lifelong and whole systems approach. Thus life course approaches to dental health start with anticipatory guidance on safe nurturing childhood free from ACEs to prevent all dental abnormalities in children.⁴² Self-injurious or self-mutilating behavior is extremely rare in the normal child.²⁹ However, such behavior has been associated with mental retardation, psychiatric disorders, develop-mental disabilities, and some syndromes.

Many factors affect the management of the developing occlusion and minimize the overall success of any treatment. The variables associated with the treatment of the developing dentition are not merely restricted to chronological/mental/emotional age of the patient. They additionally depend on the patient's ability to understand and cooperate for the treatment, intensity, frequency and duration of an oral habit, parental support for the treatment, compliance with clinician's instructions, craniofacial configuration, craniofacial growth, concomitant general illness, and accuracy of diagnosis and appropriateness of treatment.⁴³

Habit treatment modalities include patient/parent counselling, behavior modification, myofunctional therapy, appliance therapy, or referral to other specialists although not limited to orthodontists, psychologists, myofunctional therapists, and otolaryngologists. Patients and their primary caregivers must be informed regarding the consequences of an oral habit. Sometimes parents may play a negative role in the correction of an oral habit because nagging or punishment will cause increase in habit behaviors. So change in the home environment may be necessary before correction of a habit.⁴⁴ Deleterious habits affecting oral musculature are often associated with perverted or impeded osseous growth, teeth malposition, imbalance in facial musculature and psychological problems. Use of an appliance to manage oral habits is indicated only when the child wants to stop the habit and would benefit from a reminder.³⁷

Separation Anxiety as is related to normal development (DSA) is coped up by the developing child with increasing age and those who cannot cope up end up with a disorder called as separation anxiety disorder (SAD). They may get indulged in abnormal nervous habits to find a way to release their mental tension. Oral cavity is a primary site of gratification since childhood. Hence, these nervous habits primarily include abnormal nutritive or non-nutritive oral habits. Present article reports two such cases of SAD indulged with abnormal arm sucking habit and unusual association of trichotillomania and tongue-thrusting habits and their effective management with cognitive behavioral therapy and orthodontic mechanotherapy. The first case an 11 years old female patient was a victim of SA due to early birth of a sibling and got indulged in abnormal arm sucking habit for a persistent period of eight years to result in definite abnormal dentoalveolar changes to result in unesthetic open bite that forced a mother to seek dental treatment for this developing girl child.

Second case was deprived of the attention and mentally tensed due to the death of secondary caretaker, an old lady. This male child was a sufferer due to the non-attending working mother and secondly with the death of caretaker. This resulted in a compulsive obsessive disorder of trichotillomania and associated with thumb sucking habit to result in open bite. In both cases esthetics was a primary concern of the parents. While managing such cases needing orthodontic treatment in clinical pediatric dentistry, cognitive behavior management is the first step to be considered in the treatment, as habit was the main cause of malocclusion. While shaping the behavior management of such patients the treating dentist must have thorough knowledge of psychological development of the child and be considerate towards his own feelings and perspective towards dental treatment. In both of our cases the parents were constantly nagging the children to get rid of the unwanted habit that created a negative impact on the patients mind and ultimately the children became stubborn arrogant and got more indulged in the habit. So while managing these patients through counseling was done separately of parents as well and patients were dealt with tender loving care giving the priority to their own emotions throughout the conversation. While communicating with these patients a fact was noticed that the children wanted to get rid of the habit but they could not due to the compulsive act. So a positive reinforcement was done for behavior alteration in a targeted period. Also, a distraction technique was used to distract his or her attention from the habit. Patient was taught different controlled breathing techniques and asked them to practice at home.

A boy with dual combined habit of trichotillomania and thumb sucking habit was additionally asked to wear a surgeon's linen cap so as to get rid of hair pulling. Both these patients showed good change in behavior within three weeks and were happy leaving the habits. The orthodontic mechanotherapy was started with modified fixed habit breaking appliances.

In the present cases both children were indulged in unusual psychosomatic paraoral habits resulting in severe developing malocclusion which further affected their psyche by inferiority complex with regards to esthetics, as esthetic sense starts to develop in growing children by the age of eight years.

Old habits are hard to break and new habits are hard to form because the repeated behavioral patterns are imprinted in our neural pathways, but it is possible to form new habits through repetition only. Mind and body are powerful allies. Hence, in order to replace the adverse oral habits with good habits, a holistic approach is indicated, which includes patient-parent counseling,

behavior modification techniques, use of habit breaking appliances, physical exercise, followed by recall visits and reinforcement. Dentists come across patients with psychosomatic disorders on a daily basis. Hence, recognition and efficient management of such disorders in population has become a necessity in modern and developing world living in constant worry and undergoing stressful lifestyles.⁴⁵

CONCLUSION

Children may display oral habits for release of mental tension and anxiety. Separation anxiety if remains unattended or unnoticed may result in development of abnormal nervous habits and deleterious effects on development of both personality and occlusion. The resultant malocclusion and its effects on esthetics may further create anxiety and disrupt the personality of growing child. Hence, every child should have tender loving care and sense of security about protection from parent and family members, along with scope for self-expression and recreation. As correct development of a stable, functional, and esthetically acceptable occlusion is an integral component of comprehensive oral health care for all pediatric dental patients, pediatric dentist plays a crucial role in giving necessary information to parents through anticipatory guidance, proper diagnosis, management or appropriate referral. As most of the etiologic factors of malocclusion are of genetic origin and thus cannot be prevented, environmental etiological factors may be the focus of attention. In this context, the early interception of oral habits proves to be integral in preventing occlusal disturbance.

REFERENCES

1. Stone LL, Otten R, Soenens B, et al. Relations between parental and child separation anxiety: the role of dependency-oriented psychological control. *J Child Fam Stud* 2015;24(11):3192–3199. DOI: 10.1007/s10826-015-0122-x
2. Justus R. Correction of anterior open bite with spurs: long-term stability. *World J Orthod* 2001;2(3).
3. Moss E, Cyr C, Bureau JF, et al. Stability of attachment during the preschool period. *Dev Psychol* 2005;41(5):773–783. DOI: 10.1037/0012-1649.41.5.773
4. Crawford TN, Cohen PR, Chen H, et al. Early maternal separation and the trajectory of borderline personality disorder symptoms. *Dev Psychopathol* 2009;21(3):1013–1030. DOI: 10.1017/s0954579409000546
5. Ehrenreich JT, Santucci LC, Weiner CL. Separation anxiety disorder in youth: phenomenology, assessment, and treatment. *Psicol Conductual* 2008;16(3):389–412. DOI: 10.1901/jaba.2008.16-389
6. Svensson J, Barclay L, Cooke M. The concerns and interests of expectant and new parents: assessing learning needs. *J Perinat Educ* 2006;15(4):18–27. DOI: 10.1624/105812406x151385
7. Ainsworth MDS, Blehar MC, Waters E, et al. *Patterns of Attachment: A Psychological Study of the Strange Situation*: Psychology Press; 1978:116–136.
8. Main M, Solomon J. Procedures for Identifying Infants as Disorganized/Disoriented During the Ainsworth Strange Situation. *Attachment in the Preschool Years: Theory, Research, and Intervention*. 1990;1:121–160.
9. Bowlby J. The nature of the child's tie to his mother. *Int J Psychoanal* 1958;39(5):350–373.
10. Ruffin NJ. *Understanding Growth and Development Patterns of Infants*. Virginia: Virginia Dept. of Education Licensed School Psychologist and NCSP Publication; 2009:350–355.
11. Settlege CF, Bemisderfer S, Rosenthal J, et al. The appeal cycle in early mother-child interaction: nature and implications of a finding from

- developmental research. *J Am Psychoanal Assoc* 1991;39(4):987–1014. DOI: 10.1177/000306519103900406
12. Bowlby J. *A Secure Base: Clinical Applications of Attachment Theory*. New York, Brunner-Routledge. 1988.
 13. Ainsworth MDS. Some considerations regarding theory and assessment relevant to attachments beyond infancy. In: Greenberg MT, Cicchetti D, Cummings EM, editors. *Attachment in the Preschool Years: Theory, Research, and Intervention*. Chicago: University of Chicago Press; 1990:463–488.
 14. Kobak R, Cassidy J, Lyons-Ruth K, et al. Attachment, stress, and psychopathology: a developmental pathways model. In: Cicchetti D, Cohen D, editors. *Handbook of Developmental Psychopathology*. 1. Cambridge: Cambridge University Press; 2006:333–369.
 15. Kobak R, Madsen S. Disruptions in attachment bonds: implications for theory, research, and clinical intervention. In: Cassidy J, Shaver P, editors. *Handbook of Attachment: Theory, Research and Clinical Applications*. 2 ed. New York: Guilford Press; 2008:23–47.
 16. Bowlby J. *Attachment and loss*. Separation New York: Basic Books 1973;vol 2.
 17. Bowlby J. *Attachment and loss*. Loss, Sadness and Depression New York: Basic Books 1980;vol 3.
 18. Rutter M. Psychosocial resilience and protective mechanisms. *Am J Orthopsychiatry* 1987;57(3):316–331. DOI: 10.1111/j.1939-0025.1987.tb03541.x
 19. Zeanah CH, Smyke AT, Koga SF, et al. Attachment in institutionalized and community children in Romania. *Child Dev* 2005;76(5):1015–1028. DOI: 10.1111/j.1467-8624.2005.00894.x
 20. Leventhal T, Brooks-Gunn J. The neighborhoods they live in: the effects of neighborhood residence on child and adolescent outcomes. *Psychol Bull* 2000;126(2):309–337. DOI: 10.1037/0033-2909.126.2.309
 21. Howard K, Martin A, Berlin LJ, et al. Early mother-child separation, parenting, and child well-being in Early Head Start families. *Attach Hum Dev* 2011;13(1):5–26. DOI: 10.1080/14616734.2010.488119
 22. Zeanah CH, Egger HL, Smyke AT, et al. Institutional rearing and psychiatric disorders in Romanian preschool children. *Am J Psychiatry* 2009;166(7):777–785. DOI: 10.1176/appi.ajp.2009.08091438
 23. Smyke AT, Zeanah Jr. CH, Fox NA, et al. A new model of foster care for young children: the Bucharest early intervention project. *Child and adolescent psychiatric clinics of North America* 2009;18(3):721–734. DOI: 10.1016/j.chc.2009.03.003
 24. Kearney CA. Dealing with school refusal behavior: a primer for family physicians: workable solutions for unhappy youth and frustrated parents. *J Fam Pract* 2006;55(8):685–693.
 25. Albano AM, Barlow DH. Breaking the vicious cycle: cognitive-behavioral group treatment for socially anxious youth. In: Hibbs E, Jensen P, editors. *Psychosocial Treatment Research and Adolescent Disorders* Washington, DC: APA Press; 1996:43–62.
 26. Tonge B. Separation anxiety disorder. In: Ollendick TH, King NJ, Yule W, editors. *International Handbook of Phobic and Anxiety Disorders in Children and Adolescents* New York: Plenum Press; 1994. 145–167.
 27. Black B. Separation anxiety disorder and panic disorder. *Anxiety disorders in children and adolescents* 1995:212–234.
 28. Biederman J, Petty C, Faraone SV, et al. Childhood antecedents to panic disorder in referred and nonreferred adults. *J Child Adolesc Psychopharmacol* 2005;15(4):549–561. DOI: 10.1089/cap.2005.15.549
 29. Silove D, Manicavasagar V. Adults who feared school: is early separation anxiety specific to the pathogenesis of panic disorder? *Acta Psychiatr Scand* 1993;88(6):385–390. DOI: 10.1111/j.1600-0447.1993.tb03478.x
 30. Fischer D, Himle J, Thyer B. Separation anxiety disorder. In: Ammerman R, Hersen M, Last C, editors. *Handbook of prescriptive treatments for children and adolescents* Boston: Allyn & Bacon 1999;vol 2:141–154.
 31. Bernstein GA, Borchardt CM. School refusal: family constellation and family functioning. *J Anxiety Disord* 1996;10(1):1–19. DOI: 10.1016/0887-6185(95)00031-3
 32. Schaefer C. Evidence supporting the benefit of play for mild to moderate behavior problems of preschool children. In: Nash J, Schaefer C, editors. *Play therapy for preschool children* Washington, DC: American Psychological Assoc; 2010:31–45.
 33. Shah AF, Batra M, Sudeep CB, et al. Oral habits and their implications. *Ann Med* 2014; 1(4).
 34. Rani M. Synopsis of orthodontics. India: Laxman Chand Arya, AITBS Publishers and Distributors. 1998:179–200.
 35. Baer PN, Lester M. The thumb, the pacifier, the erupting tooth and a beautiful smile. *J Pedod* 1987;11(2):113–119.
 36. Shahraki N, Yassaei S, Moghadam MG. Abnormal oral habits: a review. *J Dent Oral Hyg* 2012;4(2):12–15. DOI:10.5897/JDOH12.001
 37. Guideline on management of the developing dentition and occlusion in paediatric dentistry. *Am Acad Pediatric Dent* 2014;36(6):251–261.
 38. Proffit WR, Fields Jr. HW, Sarver DM. The etiology of orthodontic problems. *Contemporary Orthodontics* 5th ed. St. Louis: Mosby; 2012:114–146.
 39. Warren JJ, Bishara SE, Steinbock KL, et al. Effects of oral habits duration on dental characteristics in the primary dentition. *J Am Dent Assoc* 2001; 132(12):1685–1693. DOI: 10.14219/jada.archive.2001.0121
 40. Campus G, Condò SG, Di Renzo G, et al. National Italian guidelines for caries prevention in 0 to 12 years-old children. *Eur J Paediatr Dent* 2007;8(3):153–159.
 41. Salute M, dellepolitichesociali L. Lineeguidanazionali per la promozione della salute orale e la prevenzione delle patologie orali in età evolutiva. 2008. http://www.salute.gov.it/portale/temi/p2_6.jsp?lingua=italiano&id=732&area=Sorriso%20salute&menu=vuoto [Accessed on 2008].
 42. Ford K, Brocklehurst P, Hughes K, et al. Understanding the association b/w self reported poor health and exposure to adverse childhood experiences A retrospective study. *BMC Oral Health* 2020;20(1):51. DOI: 10.1186/s12903-020-1028-6
 43. Guideline on management of the developing dentition and occlusion in pediatric dentistry reference manual. *Am Acad Pediatric Dent* 1990;32(6):10–11.
 44. Majorana A, Bardellini E, Amadori F, et al. Timetable for oral prevention in childhood—developing dentition and oral habits: a current opinion. *Prog Orthod* 2015;16:39. DOI: 10.1186/s40510-015-0107-8
 45. Dhimole A, Bhasin N, Pandya D, et al. Psychosomatic disorders affecting the mouth: a critical review. *Br J Med Med Res* 2016;14(5): 1–9. DOI: 10.9734/BJMMR/2016/24743