

Oral Habit as Assault to Aesthetic Dentofacial Appearance: Lessons for Stakeholders

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ABSTRACT

Objective: Habit is learned, reflexive, and repetitive behaviour displayed by an individual. When this learned pattern of behaviour involves the contraction of the musculature around the oral region is termed oral habit. Examples of oral habits are digit sucking, tongue thrusting, habitual mouth breathing and biting habits. Persistent oral habit can be detrimental to the normal developmental process of the dentofacial complex. The dentofacial complex contributes to the development the occlusion, acceptable aesthetic appearance and functionality of the stomatognathic system. The objective of this study was to review the impact of oral habit on the aesthetics of the dentofacial complex. Secondly, to emphasize the various roles of stakeholders in dealing with this habit.

Results: The appearances of the macro-, mini- and micro-aesthetic complexes were shown to be affected by the continuous indulgence in oral habits. Children who indulge in habitual mouth breathing and tongue thrusting are prone to increased facial height while incompetent lip and increased overjet can be seen among those involved in mentalis lip habit. Constriction of the buccal transverse maxillary dimension, anterior open bite and proclined maxillary incisors are seen among those involved in digit habits. Stakeholders' roles like improved awareness and early dental visits by parents/caregivers, professional inter-disciplinary collaborations and compliance to policies enacted by government agencies would go a long way in preventing the negative impact of oral habits.

Conclusion: It is evident that persistent oral habits have adverse effects on the aesthetic appearance of the dentofacial complex. A combined effort among stakeholders in the health sectors will be the best approach if oral habit is to be tackled effectively.

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INTRODUCTION

Habits are routine and automatic practices that are performed regularly in response to specific situations (Wood et al., 2014). They are usually activated in memory in an autonomous fashion without requiring executive control (Evans & Stanovich, 2013). One of the features of habit repetition or automaticity is the activation of recurring or familiar contextual cues/signals. The contextual cues are the circumstances that form the setting or lead to the event in the first place. When these circumstances reoccur, they activate the process of the habit. Apart from triggering a motor response (to execute an action), the contextual cues also activate the thought of a habitual

response. Once this habitual response is activated, an individual can act directly on this response without having to deliberate on whether to act or not to act (James, 1890).

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Habit can therefore be defined as a learned, reflex-like behaviour that is triggered unconsciously by familiar cues in a person's context; physical setting, other actions in sequence, time of day (Wood & Neal, 2007). Once a habit is formed, it can substitute for, or even bypass the conscious decision making in a relevant

situation. This phenomenon explains the reflexive, unconscious, repetitive, automatic and routine behavior displayed when habit is established. It takes time to learn a habit and they are often times accompanied by frequent repetition.

ORAL HABIT

Oral habits are repetitive patterns of behaviour involving the oral cavity, which could have detrimental effects on the oral health, general health and the quality of life. The oral cavity serves as a location for the expression of emotion and a source of relief when faced with anxious situations, hence, stimulation of this region either with the finger, tongue or nail could be a source of safety or relief (Bear & Lestor, 1987). Digit sucking habit is one of the most common repetitive patterns during the infantile stage of development (Maguire, 2000). Oral habits are one of the major causes of abnormal dentofacial development as they tend to disrupt muscular balance and bone growth, leading to alteration in the dental arch and development of abnormal occlusal traits (Larsson, 1972; Frazao & Narvai, 2006).

Several authors have classified oral habits into various forms; useful and harmful, functional, muscular and combined, empty and meaningful, compulsive, non-compulsive habit, primary and secondary habits. Considering that most habits execute their harmful effects through altered muscular functions, it can also be classified into pressure habits, non-pressure habit and biting oral habits (Table 1). Pressure habits involve the application of force on the teeth and the supporting structures (Figure 1) unlike non-pressure habits. Certain habits like chewing, breathing and swallowing that have been described as useful are actually parts of normal physiological developmental process.

There is a wide range of prevalence of oral habits that is dependent of age, race, population and gender (Onyeaso, 2004; Quashie-Williams et al., 2010; Ize-Iyamu et al., 2018). Onyeaso (2004) observed a prevalence rate of 9.9% among 7-10 years old Nigerian children while Ize-Iyamu et al. (2016) reported 71.0% prevalence rate among 2-5 years children. In another study involving a wider age range of 4-15 years, 34.1% prevalence of oral habit was observed (Quashie-Williams et al., 2010). Digit sucking is the most occurring oral habit (daCosta & Orenuga, 2002, Onyeaso, 2004, Ize-Iyamu et al., 2018, Kolawole et al., 2016). In neonates, the estimated rates of finger sucking could be as high as 95% (Leung & Robson, 1991) and one may be tempted to think that newborns have one form of physical or developmental problems when there is absence of digit sucking. Onyeaso (2004) reported 8.1% prevalence for digit sucking in Ibadan Nigeria with greater incidences among males. Ize-Iyamu et al. (2018) and Otaren et al. (2022) found 36.0% and 11.5% prevalence rates of digit sucking

among a certain Nigerian population in Benin City respectively. When the study conducted among an Indian population (Kharbada et al., 2003) was considered, the prevalence of digit sucking was noted to be low (0.7%) when compared to the observations made by some other authors among Nigerians (Onyeaso, 2004; Ize-Iyamu et al., 2018; Otaren et al., 2022). Kharbada et al. (2003) also observed tongue thrusting (18.1%) to be the most prevalent oral habit in the same study. Also, in a study conducted among an Italian population of 12-15 years old, nail biting (65.5%) was more prevalent while digit sucking (13.2%) was the least occurring (Giugliano et al., 2014). Quashie-Williams et al (2010) reported 27% prevalence rate of tongue thrusting as against 18% reported by Ize-Iyamu et al. (2018). With regard to gender, males have a higher tendency to exhibit finger sucking and bruxism (Shetty & Munshi, 1998; Ize-Iyamu et al., 2018) while females are more likely to develop lip biting, nail and pencil biting (Shetty & Munshi, 1998).

AETIOLOGY OF ORAL HABIT

The following aetiologic factors have been implicated for digit sucking; parent's occupation, working mother, number of siblings, order of birth of child, social adjustments feeding practices. The farther the position of the child in the family the more likely to develop oral habit. Children brought up by caregiver usually feel insecure and resort to digit sucking as a sense of security for the child as observed by Kolawole et al., 2016. The various theories put forward in an attempt to explain the various causative factors are;

1. Sigmund Freud's Psychoanalytical/psychosexual/classic theory (1905) - oral cavity as the primary sensory site for pleasure.
2. Oral gratification theory by Sheldon (1932): If the child is not satisfied with the sucking during feeding period, it will remain as a symptom of emotional conflict/disturbance in the form of digit sucking.
3. Benjamin's theory of Rooting reflex (1962). That children possess an inherent biologic drive for sucking
4. Learning theory (Davidson, 1967): Infants associates sucking with such pleasurable feeling as hunger and later on these events are recalled by sucking the suitable object available mainly digit.
5. Sears and Wise Oral drive theory (1982) - oral drive is established by prolonged breast feeding which strengthen the oral drive.

Tongue thrusting could be as a result of learned behaviour or late maturation phase during transition from infantile to mature swallowing pattern due to restricted space in the oral cavity, which could be from absolute or relative restriction. In addition, it could be compensatory, that is, due to an already existing anterior open bite. Anxiety, stress and boredom

loneliness, imitation of others, genetic and inactivity have been implicated as possible aetiologic factors of nail biting (Oguchi & Miura, 1977; Tanaka et al., 2008; Ize-Iyamu et al., 2018). Apart from anatomic short upper lip, mouth breathing can be caused by nasal obstruction occurring as a result of enlarged turbinates, deviated nasal septum, allergic rhinitis or presence of obstructive sleep apnea. Psychological factors, genetics and occlusal discrepancies are risk factors for the development of bruxism.

Normal growth and development of the bone of children is stimulated by normal physiological habits like chewing, speech and swallowing. Deleterious oral habits can interfere with this normal pattern of developmental process causing alteration in the

dentofacial aesthetics appearance. Although oral habits are common in the infantile period, most of them are discontinued as the child grows. The effect of continuous indulgence in oral habit ranges from distorted speech, difficulty in masticatory function, unharmonious relationship of the facial musculature to psychosocial problems (Shah et al., 2014).

This current review will resist the temptation of delving into the details of the various oral habits but will focus on their detrimental effects on the aesthetics appearance of the dentofacial complex. Secondly, it will aim at raising awareness on the increasing prevalence of oral habit and the roles of key stakeholders in tackling the menace.



Figure 1. Digit sucking mechanism causing abnormal pressure on the dentoalveolar segment and the surrounding soft tissues.

Table 1: Classification of oral habit according to Morris and Bohama (1969)

Pressure Habit	Non-Pressure Habit	Biting Habits
Lip sucking	Mouth breathing	Nail biting
Thumb sucking		Pencil biting
Tongue thrusting		
Bruxism		

ORAL HABIT AS ASSAULT TO AESTHETIC DENTOFACIAL APPEARANCE

Aesthetics is the ability to convert tangible sensation (what you see or hear) to a pleasurable psychological experience. It is a factor usually considered for the psychosocial well-being of an individual (Shaw et al., 1985). Dentofacial aesthetics is the measure of the overall level of attractiveness of the dentofacial complex based on geometric, psychological and perceptual views. The continuous indulgence in oral habits tends to alter the balance of the existing or developing dentofacial complex (Warren et al., 2001).

Deleterious oral habits like digit sucking, tongue thrusting, abnormal tongue positioning, and mouth breathing exert some levels of abnormal forces on the dentition and other circumoral tissues. Consequently, these abnormal forces ultimately redirect the pattern of growth and development of the dentofacial structures resulting in unaesthetic facial appearances (Majorana et al., 2015; Rodríguez-Olivos et al., 2022). In Orthodontics, dentofacial aesthetics is considered in three perspectives namely; macro-, mini- and micro-aesthetics (Proffit et al., 2019). Emphasis should also be placed on the Graber’s triad; intensity, duration and

frequency, when considering the impact of oral habit on the dentofacial complex. It is important to state that the numbers and position of the digits in digit-sucking habit should be taken into cognizance.

Macro-aesthetics: involves dentofacial aesthetic proportions in all three planes of space. This includes the sagittal, vertical and horizontal planes.

Mini-aesthetics: deals with the relationship of the dentition to the face, that is, tooth-lip relationship and the smile analysis.

Micro-aesthetics: this deals with the relationship of the dentition with one another.

An ideal smile involves a perfect harmony between the facial and dental components. Any alteration/assault to this harmonious relationship could be detrimental. Therefore, the impact of deleterious oral habit on these various aspects of dentofacial aesthetics will be highlighted.

Effects of Harmful Oral Habit on The Macro Dentofacial Aesthetic Appearance

Oral habits can affect the aesthetic appearance of the dentofacial complex in both the profile and frontal orientations.

A. Vertical proportion and mandibular plane:

Increased facial height and Obtuse/steep mandibular plane: When the tongue persistently occupies a backward and lower position in the oral cavity as seen in mouth breathing habit, there is consequently a



A.

downward displacement of the mandible (Valcheva et al., 2018). The displacement of the lower jaw results in disproportionate and unaesthetic increase in the lower anterior facial height as seen in patient with the long face syndrome (adenoid facies). This group of patients have steep mandibular plane (Figure 2a). Patients with anterior tongue positioning, tongue thrusting and digit sucking habits tend to develop the same facial appearance of long facial height.

B. Incisor prominence and lip posture:

During digit sucking habit the digits are usually positioned at an angle against the palate and the palatal surfaces of the maxillary incisors. The intensity of the digit sucking determines the severity of the malocclusion. This could lead to protrusion of the pre-maxillary segment, proclination of the maxillary incisors and retroclination of the mandibular incisors leading to increased overjet and a convex facial profile (Thomaz et al., 2013). Incompetent lips are also observed among individuals with mouth breathing and lower lip habit (Figure 2b). The lip habit that is mostly implicated in causing proclination of the maxillary anterior is the mentalis (lip) habit. It involves the forceful wedging of the lower lip between the upper and lower teeth (Barber, 1978). For individuals with existing increased overjet, the mentalis habit worsens the situation. Unaesthetic thin and hypotonic upper lip is also a common finding among habitual mouth breathers (Backlund, 1963).



B.

Figure 2: Increased lower anterior facial height and steep mandibular plane on a lateral cephalograph (A) and proclined maxillary incisors with incompetent lip (B).

C. Sagittal jaw relationship:

When the weight of the digit/hand and the arm from digit sucking continuously force the mandible downward, it redirects the pattern of growth of the lower jaw downward and backward. This alteration

makes the mandible to be retruded thereby leading to the development of skeletal pattern 2. Mouth breathers have tendency towards developing class 2 skeletal jaw pattern because of the persistent mouth

opening results in clockwise rotational displacement of the mandible (Arens & Marcus, 2004).

Effects of Harmful Oral Habit on The Mini- Dento-facial Aesthetic Appearance

Effect on the smile type

There may be tendency to develop unaesthetic high smile type (gummy smile) among patients with incompetent lips (from excessive inter-labial gap at rest), increased facial height and increased overjet. Oral habits like mouth breathing and digit sucking are possible oral habits that can lead to development of the condition.

Effect on buccal corridor:

Large buccal corridors give rise to less attractive smile (Janson et al., 2011). Large buccal corridor could result from constricted buccal segment of the maxillary arch occasioned by digit sucking and mouth breathing, (Figure 3). The force exerted during digit sucking habits causes the constriction of the maxillary buccal segment. On the contrary, during mouth breathing, there is a force imbalance between the tongue and the buccinator in maintaining the teeth in the dental corridor (Valcheva et al., 2018). The stretched buccinator muscles constrict the maxillary buccal segment resulting in reduced inter-molar width with resultant a wide unaesthetic buccal corridor.



Figure 3. Wide unaesthetic buccal corridor and a gummy smile type.

Effects of Harmful Oral Habit on The Micro- Dento-facial Aesthetic Appearance

Effect on height-width relationship of the teeth: The width of a tooth should be 80% of the height (Proffit et al., 2019). A reduction in height will affect the aesthetic look of the dentition. Bruxism causes the wearing of the occlusal facets on permanent teeth which are usually unaesthetic. Attrition of the incisal edges of the mandibular incisors as a result of nail biting, figure 4, (Hideharu & Kenji, 2003).

Unaesthetic anterior segment Spacing: This is commonly seen among habitual mouth breathers and individuals with tongue thrusting habits. This anterior segment spacing is usually accompanied with flaring of the incisors (figure 4b).

Effect on the gingiva: Mouth breathing gingivitis is seen in habitual mouth breathers due to the dryness of the

gingival, increasing its susceptibility to chronic inflammation.

Effects of Harmful Oral Habit on Dento-Alveolar Aesthetic Appearance

Persistent nail habit can result in crowding, rotation of the anterior teeth and also flaring of the maxillary incisors (Hideharu & Kenji, 2003). Incidences of localized alveolar destruction and root resorption (Shetty & Munshi, 1992) which could lead to the development of gingival recession (Krejci, 2000) have also been reported among those with nail biting habit. Persistent digit sucking and prolong use of pacifier can result to increased proclination of the maxillary incisors (increased overjet), infra-eruption of the maxillary incisor (causing AOB) and constricted maxillary arch with resultant posterior crossbite), due to the altered muscle pressure on the maxilla (Rossi et al., 2015), (Figure 4c).

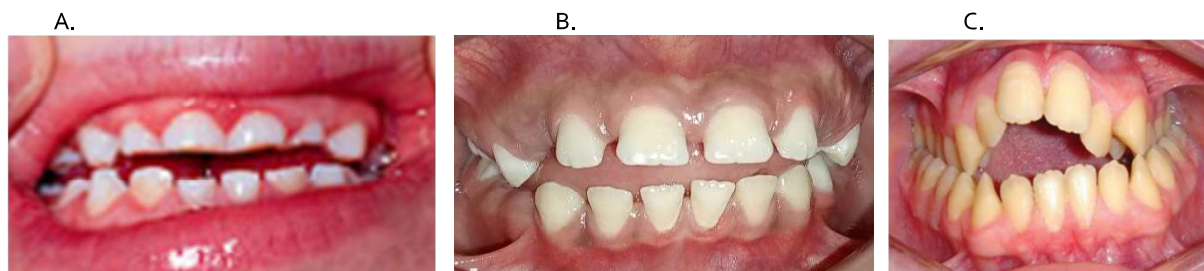


Figure 4: Attrition of the anterior teeth from bruxism (A), unaesthetic anterior spacing from habitual mouth breathing habit (B) and posterior crossbite, anterior open bite (C).

LESSONS FOR STAKEHOLDER

Stakeholders in the health sector include the patients, parents (caregivers/guardians), professional, policy makers and the public. Stakeholders must take seriously the effects of persistent oral habit on the aesthetic dentofacial appearance. Some of these effects include; negative self-esteem, being perceived as a form of social disability, prone to teasing and bullying and psychological distress (Shaw et al., 1980). In curbing this ugly trend, the various roles of some of the stakeholders will be highlighted.

Parents/caregivers/guardian

1. *Show of adequate love, affection, care and concern:* In order to enhance the emotional bond between infants and responsive caregivers, mainly the mother, it has been reported that caregivers must as a matter of responsibility show love and care to their children (Bowlby, 1958). Adequate affection and love tend to prevent the onset of separation anxiety that could lead to the development of abnormal nervous and harmful oral habit (Dhote et al., 2021), as observed among children involved nail biting habit (Oguchi & Miura, 1977).
2. *Ensure adequate and exclusive breastfeeding:* United Nations Children's Fund (UNICEF) and World Health Organization (WHO) recommend "exclusive breastfeeding, without any additional food or fluids, not even water, for the first six months and thereafter children should receive complementary foods with continued breastfeeding up to 2 years of age or beyond" (UNICEF, 2010). Breastfeeding promotes normal jaw growth and development with good labial and tongue posture, adequate nasal breathing and correct transverse diameter of the palate (Campus et al., 2007). 'The longer the duration the breastfeeding, the less likely the child will develop non-nutritive sucking habit and mouth breathing habit (Lopes et al., 2014) while early weaning (before 6 months) is a risk factor for the development of oral habit (Miotto et al., 2016, Carvalho et al., 2021). In the event that the mothers are pre-occupied with other activities,

they are advised to give dummy or pacifier instead of digit sucking because it is easier to wean the child off pacifier than digit sucking (Canadian Paediatric Society, 2003).

3. *Early dental visit.* Early dental visit will assist parents to identify the oral habit early enough and also to prevent the development of malocclusion (Alvarez-Páucar & Revoredo-Morote, 2019). Parents' role in the correction of oral habits could be counter-productive. Onyejaka et al. (2017) observed that most parents (54.5%) employed punishment as a method to break oral habit. During this early clinic appointment, the parents are counseled on the proper methods of dealing with bad oral habits.

Professionals (Provider/Institution)

1. *Awareness campaign among health professionals:* Early interception of oral habits is proven to be an integral part in preventing occlusal/facial disturbance (Warren et al., 2001; Dhote et al., 2021). This early interception is possible when there is proper awareness among health care professionals. Kohli et al. (2022) observed poor awareness among health care professionals on the cause, effect and prevention of oral habit.
2. Health care professionals must advise/educate parents and guardians on the risks of prolonged indulgence in sucking habits and the importance of children receiving preventive multidisciplinary care to minimize future risks (Nihi et al., 2015).
3. *Effective collaboration among relevant health care professionals.* Due to the multifactorial aetiological factors of oral habits, inter-disciplinary approach should be employed in the management of children with bad oral habit (Majorana et al., 2015). From identifying the habit by a family physician or a pediatrician to the point of intervention by the paedodontic and orthodontist, a lot of collaborative effort is required (Indushekar et al., 2012). According to Mockè (2021) preliminary psychological evaluation should be performed to determine the actual emotional status of a child involved in oral habit before any form of

orthodontic intervention. Also, the age and status of the occlusion must be taken into account because various treatment modalities are tailored according to when the child present. Suffice to state that majority of the habits can be tackled using the counseling and reward systems especially if caregivers are very supportive (Townsend, 2013).

Policy makers

1. *Public Prevention-awareness Campaign on Harmful Oral Habits.*

Policy makers and by extension government agencies can also be involved in creating awareness on the need for early preventive protocols on when/how to discourage the habit (Van Norman, 1985). Sheriff et al., (2021) reported that 50% of parents were not aware of these harmful oral habits by their children.

Also, there is need to educate mothers on proper mode of breastfeeding and use of pacifier (Muhammad et al., 2020). This awareness campaign should be taken to schools, places of worship and market places. The protocol developed through focus group discussion by the Public Infant Oral Health Program of the State University of Londrina (PIOHP-UEL) could serve as a guide for government agencies (Scarpelli et al., 2016).

The cardinal points of this protocol are;

- a. To make guardians/children aware of the importance of eliminating oral habits.
- b. To answer questions (from parents) on the association between habit and malocclusion.
- c. To create a support network where they could exchange experiences and leave the meeting stronger to deal with this difficult phase,
- d. To contribute to introducing healthy practices and maintaining good oral health.

2. *Compliance with the Maternal protection act:*

Ella et al (2016) reported that majority of caregivers cited job description as a major reason they don't spend quality time with their children. Parts of UNICEF's major policy in the areas of children's well-being, women empowerment and the provision of decent work for caregivers include;

- a. Sufficient paid leave (at least 6 months maternity leave) to all parents and caregivers.
- b. Support for mothers to breastfeed exclusively for the first six months of life, in line with WHO and UNICEF recommendations, and to continue breastfeeding for as long as they choose. This includes the provision of breastfeeding room_at workplaces.

Breastfeeding room is an exclusive and properly equipped area for mothers to breastfeed their children, express milk and store it. The breaks taken by the nursing mothers should be counted as working hours and remunerated accordingly. Compliance with the

policy will further strengthen the bond between mothers and their children. In Nigeria, Worugji & EtuK (2005) reported that the legal system does not guarantee and protect the freedom of the nursing mother to exclusively breastfeed the child for at least the 6 months as propagated by the National Breastfeeding Policy.

CONCLUSION

The effects of persistent para-functional oral habit on the aesthetic appearance of the dento-facial complex are enormous. These effects can lead to negative psychological impact and low quality of life due to bullying and calling of names by their peers thereby, resulting in low output in class. Early dental visit is key to prompt interception of malocclusion and prevention of poor aesthetic output that may occur from continuous indulgence. Interdisciplinary/joint stakeholder approach in management will yield better outcome.

RECOMMENDATIONS

1. There is the need for increased awareness campaign among healthcare professionals on the increasing prevalence, causes, effect and treatment of oral habit.
2. Parents and care givers should be properly educated on the need for prevention and encourage early dental visit for interception of the oral habits.
3. Health institutions need to set up oral habit clinic which should include all relevant professionals.
4. Follow up visit to government agency and strict adherence to government policy on Maternity Protection Act.

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