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Oral habits in relation to malocclusions: A review

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Abstract--Oral habits are learned patterns of muscle contraction and have a very complex nature. They are associated with anger, hunger, sleep, tooth eruption and fear. Basically a habit is a routine of behavior that is repeated regularly and tends to occur unconsciously. Habits are one of the major etiologic factors which will lead to malformation in dento-facial structures. Habits are the most frequent cause of these malformations mostly seen in the early childhood and mixed dentition stages. The oral bad habits that cause malocclusion problems include: Thumb sucking, it is a normal habit for babies, but causes serious orthodontic problems if it continues long after the eruption of permanent teeth. Prolonged thumb sucking can create crowded, crooked teeth, or bite problems and speech problems. Lip-biting or fingernail biting, both habits can shift the teeth out of alignment. Tongue thrusting, some children thrust their tongue forward, pressing it against the lips with a force that can result in teeth malocclusions such as 'open bite' or teeth protrusion (overjet). Modern orthodontics are usually able to treat most teeth malocclusions successfully, but prevention can help the family to avoid the large cost of orthodontic treatment. So, Parental awareness about the adverse oral habits is also another factor which needs to be looked into, negligence of the

parents can become a cause to the dentofacial anomalies in the children.

Keywords---dentofacial anomalies, habit.

Introduction

A habit is a repetitive action or tendency towards an act that is being done offhandedly. Habits are one of the major etiologic factors which will leads to malformation in dento-facial structures. Repetitive behaviours are common in infantile period and most of them are started and finished spontaneously.¹ As the mouth is the primary and permanent location for expression of emotions and even is a source of relief in passion and anxiety in both children and adults, stimulation of this region with tongue, finger, nail or cigarette can be a palliative action. Based on research, that performed to 92 children of Yayasan Bahtera Bandung with 6-12 years of age, reported that about 50% of children have oral habits, with the proportion of thumb sucking habit 43.8%, lip biting and lip sucking 34.8%, and tongue thrusting 8.7%, nail biting as well as mouth breathing each 6.55%.² Occlusion according to Dewanto (1993) is teeth surface of the upper jaw contact to occlusal surface of lower jaw teeth at the time of the upper jaw and lower jaw closes. An occlusion is the change in the relationship of teeth surface (maxilla) in the upper jaw and lower jaw (mandible) that occurred during the movement of the mandible and ended with full contact to the teeth of both jaw.³ Deleterious habitual patterns of muscle behaviour, often are associated with perverted or impeded osseous growth, tooth malposition, disturbed breathing habits, difficulties in speech, imbalance the facial musculature and psychological problems.⁴

Oral habits could be divided into 2 main groups

Acquired oral habits

Include those behaviours which are learned and could be stopped easily and when the child grows up, he or she can give up that behavior and start another one (Finn, 1998).⁶

Compulsive

Consist of those behaviours which are fixed in child and when emotional pressures are intolerable for the child, he or she can feel safety with this habit, and preventing the child from these habits make him or her anxious and worried (Finn, 1998).⁷

Some Antagonistic Forces Acting on the masticatory apparatus are summarized as below:

- Lip-tongue
- Cheeks – tongue
- Eruption of teeth – masticatory muscles masseter, temporalis and medial pterygoid

- Air pressure of the skin - tongue (in closed mouth)
- Air pressure in nasal cavity -tongue (open mouth) well as mouth breathing.⁷

Malocclusion is a form of relationship of the upper and lower jaw which deviate from the standard form that is accepted as a normal form, malocclusion can be caused by imbalance of dentofacial structures⁸

Classification of malocclusion

- **Protrusion**
Protrusion is a tooth that its position is forward. Protrusion can be caused by heredity, bad habits as finger sucking and lower lip sucking, pushing the tongue forward, wrong habit of swallowing as well as mouth breathing.
- **Intrusion and Extrusion**
Intrusion is the movement of the teeth away from the occlusal. The movement of the intrusion requires good control of forces. Extrusion is the movement of the teeth near occlusal plane.
- **Crossbite**
Crossbite is a state if the jaw is in centric relation. There are abnormalities of the teeth in a direction transverse of maxilla teeth to the mandible teeth that can affect the whole or half-jaw, teeth, or a single tooth only. Based on the location, cross bite can be divided into two:
 - **Anterior crossbite**
A state of centric relations in the jaw, but there are one or more anterior teeth in maxilla that its position is next to the lingual of mandible anterior teeth.
 - **Posterior crossbite**
Abnormal relationship of buccolingual from one or more mandibular posterior teeth.
- **Deep bite**
Deep bite is a condition where the distance of maxilla incisive incisal contact to the mandible incisive incisal in the vertical direction is more than 2-3 mm. In the case of deep bite, posterior teeth are often linguo version or tilted to the mesial and mandible incisors often crowded, linguoversion, and supraocclusion.
- **Open bite**
Open bite is condition if there is presence of occlusal or incisal space of the teeth when the upper jaw and lower jaw in centric occlusion. open bite according to the location are:
 - **Anterior open bite**
It is defined as a malocclusion with no contact in the anterior region of the dental arches, and the posterior teeth in occlusion. It is called combined open bite when malocclusion extends to the posterior segment.
 - **Posterior open bite**
Posterior open bite can be defined as failure of contact between the posterior teeth when the teeth occlude in centric occlusion, there is no occlusion between the maxillary and mandibular premolars. The maxillary and mandibular molars have a slight contact. The anterior overjet and overbite is normal.

- Combination of anterior and posterior (a total of open bite) exists in both the anterior and posterior, unilaterally or bilaterally.
- Crowding
Crowding is a condition when teeth arranged outside the normal arrangement. Crowding occurs due to basal arches are smaller than Coronal arch. Basal arch is a place of process alveolus on which are teeth lied on, coronal arch is the most width of the coronal teeth or the number of the most massive of mesiodistal teeth crown. The degree of severity of crowding of teeth are:
 - Mild Crowding
There are little of crowded teeth, often occur in mandible anterior teeth, and considered as normal variation. There is no need of treatment.
 - Severe crowding
There are severe crowded teeth so that may lead to bad oral hygiene.⁸

Classification of oral bad habit in children

Thumb sucking

Thumb sucking is the most common oral habit and it is reported that its prevalence is between 13 to 100% in some societies. Previous authors have found the incidence of thumb sucking is more than 50%.⁶ The prevalence of this habit is decreased as age increases, and mostly, it is stopped by 4 years of age.^{7,8} Continuation of the habit past the age at which the permanent incisors erupt may however, prove detrimental. The more persistent the habit the greater its contribution to the disturbance of forces operating on the teeth.¹⁰ Thumb sucking has 2 types:

- *Active*: In this type, there is a heavy force by the muscles during the sucking and if this habit continues for a long period, the position of permanent teeth and the shape of mandible will be affected.¹⁰
- *Passive*: In this type, the child puts his/her finger in mouth, but because there is no force on teeth and mandible, so this habit is not associated with skeletal changes.

The duration, frequency and intensity of suckling action determines the intensity of malocclusion.¹⁰

The side effects of finger sucking

- Anterior open bite.¹⁰
- Increased overjet.¹⁰
- Lingual inclination lower incisor and labial inclination upper incisor.
- Posterior cross bite.¹¹
- Compensatory tongue thrust.¹⁰
- Deep palate. ¹¹Speech defect.¹²
- Finger defects (Eczema of the finger due to alternate dryness and moisture that occurs and even angulations of the finger).¹²

Mouth breathing

Effects of mouth breathing include:

- *Effects on growth and general health*²⁵
Purification of the inspired air: When air is inspired through the mouth, it is not cleaned, warmed and moistened; secretion of mucus is stopped gradually. The irritants accumulate resulting in local inflammation discomfort and pain. The child is usually restless and is affected by repeated cold, cough and loses general body resistance to other diseases. Pulmonary development: With oral respiration the resistance is lacking and poor pulmonary compliance is seen. This gives the appearance of pigeon chest. Lubrication of oesophagus: In mouth breathers the oral pharynx is dry and the mucous collects often to be expectorated.
- *Effects on intra oral structures*
Moulding action of upper lip on incisors is lost thereby resulting in proclination and spacing of maxillary anteriors. The lower lip is heavy and everted. V-shaped maxilla and high palatal vault. This is due to lack of normal musculature stimulation from the tongue and owing to the increased pressure on the cuspid and primary molar areas by the strained orbicularis oris and buccinator muscles, the buccal segments of the maxilla collapse giving a V shaped maxilla and a high palatal vault. The patients are more likely to have posterior dental cross bite. Anterior open bite may be seen. Mandible is rotated in a clockwise manner so that the mandible is in a more vertical and backward direction, causing elongation of the lower anterior face height, open bite and retrognathia. Mandible shows more obtuse gonial angle. The increasing overjet and increased pressure from the stretched cheeks might cause a narrower maxillary dental arch.¹³

Lip chewing

The lip chewing is almost in all cases in inferior lip and can cause the upper incisors to tip labially and the lower incisors to collapsed lingually with the lower lip wedged between the upper and lower anterior teeth. This habit is related to dryness and inflammation of lip and in severe cases will cause vermilion hypertrophy and in some people can cause chronic cold sore or lip crack.⁷

Bruxism

The actions of masticatory system are divided into 2 groups. Functional actions such as mastication, speaking and swallowing, and para functional actions such as teeth impacting (clenching) and bruxism. However, bruxism in nights is unconsciously and mostly it is with sound production.³⁷ Sleep bruxism in the adult occurs during stages first and second of non-rapid eye movement (REM) sleep and REM sleep. Sleep bruxism has 2 types: Primary or idiopathic and secondary or iatrogenic. The first type is without any medical reason and the secondary type is whether with use of drug or without the use of drug.¹⁴

Nail biting or onychophagia

This oral bad habit which is position of upper and lower incisive teeth have pressured by nail. According to Finn(1971), the habit of nail-biting habit is normal in children who previously have a habit of finger biting. In addition, according to Alexander and Lane (1990), etiology of nail biting due to stress, imitation of family members, hereditary, the transfer from the habit of finger sucking, and fingernail is not neat. In some cases, these habits can cause atrision in the lower anterior teeth.⁷

Nail biting is a common and untreated medical problem among children (Tanaka et al., 2008). This habit starts after 3 to 4 years of age and is in its peak in 10 years of age. Its rate increases in adolescence, while it declines later. This problem is not gender dependent in children less than 10 years of age, but its incidence in boys is more than girls among adolescents (Tanaka et al., 2008). This problem is a reaction in response to psychological disorders and some children will shift their habits from thumb sucking to nail biting.

Complications caused by nail biting

Malocclusion of the anterior teeth, teeth root resorption (Odenrick and Brattstrom, 1985), intestinal parasitic infections (Escobedo1 et al., 2008), change of oral carriage of Enterobacteriaceae (Baydas et al, 2007), bacterial infection and alveolar destruction (Tanaka et al., 2008). Moreover, about one forth of patients with temporomandibular joint pain and dysfunction have been shown to suffer from nail biting habit (Saheeb, 2005). More than half of parents of children with nail biting, have a kind of psychological disorders such as depression (Ghanizadeh, 2008; Ghanizadeh and Mosallaei, 2009). It is seen in clinic that boys with nail biting have a kind of psychological disorder especially attention deficient hyperactivity disorder (ADHD) more than girls. This habit in higher ages will be replaced with some habits such as lip chewing, gum chewing or smoking (Finn, 1998). Children with nail biting should be evaluated for emotional problems.⁶

Tongue thrusting

Tongue thrust is a defined as a condition in which the tongue makes contact with any teeth anterior to the molars during swallowing.¹⁵ Tulley1 1969 - states tongue thrust as the forward movement of the tongue tip between the teeth to meet the lower lip during deglutition and in sounds of speech, so that the tongue becomes interdental. Tongue thrust is an oral habit pattern related to the persistence of an infantile swallow pattern during childhood and adolescence and thereby produces an open bite and protrusion of the anterior tooth segments the first classification was given by byjames s. Braner and Holt but later was classified as ;

Simple tongue thrust: (Anterior tonguethrusting)¹⁵

It is defined as tongue thrust with a teeth together swallow. It is usually associated with the history of ofdigit sucking. The features observed depends upon

the duration, intensity and frequency of the habit. Some of the features are common to thumb sucking and mouth breathing also.

Intra oral features

- Proclined, spaced and sometimes flared upper anteriors resulting in increased overjet.
- Retroclined or proclined lower anteriors depending upon the type of tongue thrust.
- Presence of an anterior open bite.
- Presence of posterior crossbites.¹⁵

Extra oral features

- Usually dolichocephalic face.
- Increased lower anterior facial height
- Incompetent lips
- Expression less face as the mandible is stabilized by facial muscles instead of masticatory muscles during deglutition. Speech problems like sibilant distortions and lispings etc. Abnormal mentalis muscle activity is seen.

Complex tongue thrust/ anterior and posterior tongue thrust¹⁶

It is defined as tongue thrust with a teeth apart swallow. It is usually associated with chronic nasorespiratory distress, mouth breathing, tonsillitis, and pharyngitis.

Features

The following features are seen:

- Proclination of anterior teeth
- Bimaxillary protrusion
- This kind of tongue thrust is characterized by a teeth apart swallow.
- The anterior open bite can be diffuse or absent.
- Absence of temporal muscle constriction during swallowing.
- Patients with a complex tongue thrust combine contractions of the lip, facial and mentalis muscle.
- The occlusion of teeth may be poor. Poor occlusal fit, no firm intercuspation.
- Posterior open bite in case of lateral tongue thrust
- Posterior crossbite

Management of tongue thrust

Age Tongue thrust often self-corrects by 8 or 9 years of age by the time the permanent anterior teeth completely erupt. The self-correction occurs because of an improved muscular balance during swallowing as the mature swallow is adopted. However it is seen that orthodontic interception is usually more

successful than correction if initiated during the early mixed dentition stage of dental development or between ages 9-11 years.¹⁶

Appliances to guide the correct positioning of tongue

Once the patient is familiar with the new tongue position an appliance is given for training the correct positioning of the tongue.

- Pre orthodontic trainer/ Tongue trainer this appliance aids in the correct positioning of the tongue with the help of tongue tags. The tongue guards prevent the tongue thrusting when in place can also be used to correct mouth breathing habit.
- Mechano therapy Both fixed and removable appliances (cribs or racks) can be fabricated to restrain anterior tongue movement during swallowing with the objective of retraining the tongue to a more posterior superior position in the oral cavity. Both fixed and removable are valuable aids in breaking the habit.¹⁶

Conclusion

Old habits are hard to break and new habits are hard to form because the behavioural patterns we repeat are imprinted in our neural pathways, but it is possible to form new habits through repetition. In order to replace the adverse oral habits by good habits, a holistic approach is indicated, which includes patient-parent counselling, behaviour modification techniques, use of habit breaking appliances, physical exercise, followed by recall visits and reinforcement. Prevention and interception of these deleterious oral habits at an early stage is utmost important for the good oral health of the children. Techniques to eliminate the undesirable oral habit should be introduced when a program plan, which will outline the replacement behaviours. The point is considerable that most parents who spend their time with their children are not aware of the harmful oral habits and their bad effects. Dentists should provide parents with information about different types of oral habits, etiology of habits especially with emphasis on role of stress in development of them and ways to manage and treat habits at home.

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