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Review Article

Risks of Parafunctional Habits

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Abstract

At present, the development of craniofacial structures cannot be assessed without a detailed analysis of the influence of the different functions that take place in the oral cavity. Bad oral habits or parafunctional habits that persist over time, such as infant swallowing, thumb and pacifier sucking, lip interposition and mouth breathing, alter craniofacial growth and development and are of great importance in establishing the severity of dentomaxillary anomalies. Therefore, a bibliographic review was carried out with the aim of describing the main complications and risks of parafunctional habits.

Keywords: Habit; Parafunctional; Orthodontics; Dysfunction; Neuromuscular

Introduction

Nowadays, the development of craniofacial structures cannot be evaluated without analyzing in detail the influence of the different functions that are carried out in the oral cavity. Bad oral habits or parafunctional habits that last over time, such as infant swallowing, thumb and pacifier sucking, lip interposition, and mouth breathing, alter craniofacial growth and development and are of great importance in establishing the severity of dentomaxillary anomalies [1,2].

Functional and parafunctional habits. A habit refers to behavior that is performed repeatedly, involuntarily, and unconsciously. The oral cavity is a structure that, due to its physiology, allows the expression of emotions in both children and adults, seeking to repress or relieve them through the stimulation of some of the structures that make it up. (Kamdar R, 2019).

When we talk about the functions of the oral cavity, we refer to the abilities that its organs have to work according to normal parameters. It can be physiological or parafunctional; the latter occurs as a result of prolonged action or degeneration of a normal function, or as a necessary act, and its importance lies in the fact that these habits exert harmful forces against the teeth, dental arches and soft tissues causing alterations in dental occlusion. Depending on the frequency, intensity and duration with which it is practiced, it can produce an imbalance between external and internal muscular forces, which induce bone deformations and alter the posture of the dental organs. (Pruneda J, 2015).

Oral habits that are associated with emotions are usually parafunctional habits, among which we can highlight: digital sucking, atypical swallowing, oral breathing, bruxism, onychophagia, use of pacifiers, labial interposition, lingual interposition. These habits, as they are not physiological habits, exert excessive and harmful forces, which can produce negative effects on the stomatognathic system, mainly at the dentoalveolar level, of the soft tissues, triggering malocclusions and favoring deformations at the bone level. The World Health Organization (WHO) even classifies it as the third most frequent oral health problem. The degree of the harmful effect of the habit will depend on the intensity, frequency and duration of the habit. (González R, 2012) Functional alterations can reside in different places or stages of the neuro-psycho-motor complex. The functions that derive from the activity of this complex are related to the survival of the individual [1,2].

Objective

Describe the main complications and risks of parafunctional habits.

Reference search methods

The scientific information was compiled through a search using the following descriptors in English: The Medical Subject Headings (MeSH): "parafunctional habits, dentistry, complications and risks in dentistry

Analysis strategy

The search was based solely on main complications and risks of parafunctional habits.

Developing

Habits and parafunctions must be differentiated for a correct diagnosis, treatment and prognosis of dento-maxillofacial anomalies. Based on this, three types can be distinguished:

- Organic or functional problems that trigger anatomical, histological (tissue) or neuromotor complex alterations.
- Involuntary and/or compensatory resources used by the individual to compensate for impediments that disrupt vital functions such as breathing, chewing, swallowing, speaking, among others.
- Acquired habits or behaviors that are not related to organic causes and that respond to psychological or social reasons. Within the first types, organic and/or functional problems are found in the tongue, mouth breathing and atypical swallowing [1,3,4].

The alteration of the tongue at rest can respond to various pathologies, the most frequent being persistent mouth breathing. A low tongue position facilitates oral breathing and therefore open bites and class II division 1 malocclusions. In the second type, compensatory responses, there may be lip interposition or lisping. Lip sucking causes bioversion of the incisors. Finally, the third type is habits. Oral habits include: abnormal sucking, digital sucking, lip sucking, tongue protraction, mandibular propulsion or others such as onychophagia.

These habits do not have a defined behavior, their prevalence is so variable that prevalence rates have been reported from 0.29 in India to 0.76 in Cuba. As for age, this type of habits manifests itself early; some of them, such as digital sucking and tongue habits, have been significantly related to this variable. In relation to gender, a higher prevalence has been observed in girls, however, not all reports present this same prevalence [4-6].

In relation to frequency, the habit of digital sucking is present in more than 50% of small children; it is so common in infancy that it is considered normal up to 18 months. The prevalence is also very variable, since prevalence rates have been reported from 0.07 in India to 0.72 in Sweden, and it is generally more frequent in girls. The relevance lies in the fact that it has been very frequently associated with the presence of anterior open bite. Regarding lip sucking, it occurs in patients with malocclusions accompanied by a large incisor overhang, although it can also appear as a variant or replacement of digital sucking; however, its prevalence is much lower. (Murrieta-Pruneda J, 2009).

Most common parafunctional habits. • Bruxism Bruxism is defined as a parafunctional activity characterized by clenching or grinding the teeth due to excessive strain on the mandibular muscles. It is one of the most prevalent, complex and destructive orofacial disorders; when it occurs during sleep, it is considered a parasomnia (the third most common). Although its etiology is still undetermined, these parafunctional activities are possible in normal people, when there are some internal and external psychological factors, which alone or in combination, can lead to this type of behavior (Cortesea G, 2019).

The causes of bruxism in childhood can be various, as many factors influence the appearance of this habit. Among these causes that trigger this behavior, we can mention temporomandibular joint disorders, hypopnea, malocclusion, anxiety, stress, behavioral disorders and personality. In general, children with bruxism are more tense than children without this behavior. (Jerez E, 2019).

Figure a

Wear facets on primary teeth in a 7-year-old patient (Cortese G, 2009)

Figure b

Permanent incisor fracture in a 9-year-old patient, coinciding with contact in the mandibular position where bruxing occurs (Cortese G, 2009) The consequences of bruxism are: TMJ disorders, as well as myofacial pain, pain when opening and closing. It can also cause fatigue and pain in the masticatory muscles, which causes hypertrophy of the same.

Likewise, among the discomforts produced are the sensation of wanting to sleep during the day and problems falling asleep. At the dental level, in addition to the deterioration in the cusps that occurs, mobility of the teeth can also be observed, problems in the support structures, increased production of cement, inflammation of the pulp, pulp necrosis, gingival recession and inflammation. (Saulue P, 2015).

Currently, no treatment has been completely effective in reversing bruxism. However, treatments have been focused on cognitive-behavioral therapies, family education on sleep habits in mild cases, and patient education on parafunctional behavior. When bruxism is severe, the use of temporary dental splints under the supervision of the dentist has been chosen. (Saulue P, 2015) In patients with sleep disorders and breathing problems, treatment has been aimed at eliminating these problems, through tonsillectomy or a combination of adenoidectomy [6-8].

When sleep apnea occurs, the transverse expansion of the maxilla decreases bruxism as does the use of a splint for the jaw. It has been concluded that the enlargement and adaptation of the airways can be a good strategy to reduce nocturnal bruxism. Among some behavioral therapies, it has been advised not to chew gum during the day so as not to generate a continuity of the habit (without gum) during sleep. Also, applying moist heat to the face to relax the muscles and prevent them from tensing up. Avoiding the use of television or electronic devices before going to sleep prevents the muscles from being stimulated and thus avoids the risk of suffering from bruxism. (Saulue P, 2015).

Techniques for managing bruxism in children. It can be done in the following way

- Education for parents or caregivers about the presence of habit.
- Psychological and behavioral therapy in which muscle relaxation occurs.

Appliance such as a Klammt elastic activator

If clicking is present, the activator should be placed with a posterior plane to produce an infracondylism and recover the disc.

The Klammt Elastic Activator is an appliance that has the function of bringing the mandible forward, as well as exercising the facial muscular system. It is contraindicated in children with dolichofacial growth and posterior crossbite. (From Cassia G, 2007).

• Atypical swallowing and lingual interposition The stomatognathic system has swallowing as a secondary function, which is an automatic motor action in which the muscles of respiration and the gastrointestinal system act. In normal swallowing, the teeth occlude in harmony, the tongue rests on the palate in the area behind the upper incisors without contacting them and then the swallowing movement is established. (Medina C,2010).

Atypical swallowing is an oral habit that produces myofunctional habits, due to the position of the tongue during swallowing. Sometimes, the physiological maturation of the swallowing mechanism has not fully developed; a childhood pattern, called “atypical swallowing”, persists beyond the physiological limit. Consequently, during swallowing, the tongue is pushed forward, generally at the level of the palatal surfaces of the upper incisors, or the tongue is interposed between the dental arches accompanied by a contraction of the mimic muscles, in particular the orbicularis oris and chin tab muscles. (Awuarpara S,2021).

The forces generated during this function, in patients with oral habits of tongue interposition and atypical swallowing, are sufficient to cause dental or dentoalveolar modifications, without being responsible for skeletal alterations. This interference stimulates or modifies the direction of growth in certain structures, which may influence the genesis of open and anterior and/or lateral crossbites, inhibition of the eruption of one or more teeth, vestibule or linguoversions, and dentoalveolar protrusion. (Sánchez A, 2007).

The persistence of an infantile swallowing pattern beyond the bottle-feeding period is no longer considered normal. Most patients complete the transition to the adult swallowing pattern between 2 and 12 years of age, but the infantile pattern may be prolonged; children with digital habits, airway disorders, chronic allergies, neuromotor deficits, or orofacial skeletal abnormalities are at greater risk of the tongue-thrust pattern persisting. (Maguire JA, 2000).

Figure c

Case of atypical swallowing developing an Anterior open bite. Infant swallowing is related to sucking and adult chewing. The transition from infant swallowing to adult swallowing occurs over several months, depending on the time of important neuromuscular maturation of development, but most children achieve mature swallowing at one and a half years of age.

This mature swallowing is characterized by the fact that the teeth are together, the jaw is stabilized by the muscles that elevate the jaw (without noticeable movements of the perioral muscles), the tip of the tongue rests against the palate, above and behind the incisors, and there are minimal contractions of the lips and facial muscles (Enlow DH,1984).

In atypical swallowing, there is a breakdown in balance and this fact can result in the establishment of a dentomaxillary anomaly, even altering growth patterns, in addition to phoniatric alterations (Quiroga B, 2013) (McNamara JA, 1981) Lingual interposition is defined as the placement of the tongue between the teeth in the anterior (incisors) or posterior (molars) area, observed at rest or in some function such as swallowing or phonoarticulation [9-11].

It is associated with ADM such as open bite, protrusion of upper and lower incisors, as well as wear of the incisal edges of the incisors. At the level of development of the craniofacial mass, the abnormal activity of the tongue determines a change in facial morphology. The hyperactivity of the tongue depressor muscles positions the tongue on the floor of the mouth, instead of being supported on the palate in its resting state.

This position of the tongue on the floor of the mouth stimulates mandibular growth in the anteroposterior and transversal direction, which is often responsible for the presence of crossbites and sometimes even progenies. As the tongue is in this low position, lingual stimulation of the transverse development of the maxilla does not occur, generating compression of the upper jaw. If we add this to the increase in mandibular size, it is easy to understand the genesis of this malformation. In infant swallowing, the tongue rests between the incisors, instead of behind them, which produces an anterior open bite at the dentoalveolar level, which is fed back by neuromuscular activity. In order to create a vacuum, the patient places the tongue between the teeth when swallowing and this increases the anterior open bite. (Muller K, 2014).

Digital Sucking Children are conditioned and learn at a very early age that they must suck to survive, sucking in infants and toddlers stems from the physiological need for nutrients. Current understanding of child development suggests that sucking behaviors also arise and continue because of psychological needs. Therefore, normally developed children have an inherent, biological drive to suck. This need to suck can be met through nutritive sucking, including breastfeeding and bottle feeding; for the infant, food is obtained through non-nutritive sucking on objects such as fingers, pacifiers, or toys that may serve primarily to satisfy psychological needs (Warren JJ, 2015).

The morphology, determinants and early development of hand-mouth coordination or the early propensity to bring the hand into contact with the mouth is an interesting challenge for developmental theories, as it demonstrates the existence of a highly organized pattern of action at birth that finds new functional expressions throughout lifespan in various activities such as self-feeding, nonverbal communication, self-sedation, self-stimulation or oral eroticism, object manipulation and exploration [12-14].

Although sucking is considered normal in infants, prolonged duration of sucking can have consequences not only with regard to developing orofacial structures and occlusion, but also on the psy-

chological development of the infant that will extend into adulthood. Furthermore, identifying individuals at risk of developing prolonged sucking habits can help improve clinician interventions to prevent the consequences of this potent habit. (Friman PC, 1987) (Jyoti S,2014).

Prenatal expression of hand-mouth coordination Fetuses display complex behavioral patterns such as thumb sucking during the third trimester of pregnancy. Bruises from intense fetal sucking are commonly found on the hand, thumb, or wrist of the newborn. (Rochat P,2015).

This demonstrates that the hands and mouth are brought into contact by the fetus, and points to prenatal precursors of the activities observed in the newborn. Ultrasound studies of human fetal behavior show that hand-face contacts are common, and are frequently observed from 12 weeks gestational age. Ultrasound observations reveal movements of the hand slowly touching the mouth. (Vries JIP, 2004) At around 24 weeks, sucking activities are reported, and at around 29 weeks, such activity is loud enough to be audible. (Humphrey T,2015).

In summary, there is good evidence of a link between prenatal oral and manual behavior.

Although it is still unclear what the function of this type of link is, it is likely that the origin of the coordination between manual and oral actions lies immediately after birth. Developed in utero, the functional link between hand and mouth continues at birth, particularly in the newborn. Hand-mouth coordination at birth Despite drastic environmental changes, behavioral continuity is maintained after birth [15-18].

Neonates spend up to 20% of their waking hours with their hands in contact with the oral region. Different hypotheses have been developed about the function of early hand-mouth coordination, some suggesting that hand-mouth and hand-face contacts are a form of primary self-discovery. Some have proposed that hand and finger sucking by the newborn has a self-soothing function, linked to the hunger mechanism. Others have interpreted hand-mouth coordination in the newborn as a precursor to self-feeding activities and an early form of oral capture. (Rochat P,2015) (Jyoti S,2014).

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Others have interpreted hand-mouth coordination in the newborn as a precursor to self-feeding activities and an early form of oral capture. (Rochat P, 2015) (Butterworth G,1988) Digital sucking Digital sucking is the most common oral habit and has been reported to be between 13 and 100% prevalent in some societies. (Shahraki N, 2015) Several theories have suggested that prolongation of this habit may develop from oral fixation, emotional disturbance or due to hunger or insufficient satisfaction of the need to suck in infancy. (Freud S,2015) (Indushekar GB, 2015).

The prevalence of this habit decreases with increasing age, and mostly stops around 4 years of age. In case this habit persists beyond this age it can result in a number of physical problems. (Jyoti S, 2014) Moyer classifies this habit into 3 Phases of Development of Finger Sucking: (Rao A, 2015) Phase I – Normal and subclinically significant sucking: It is seen in the first three years of life. The habit is considered normal during this phase and usually ends by the end of it. Phase II – Clinically significant sucking:

The second phase spans between 3-6 years of age. Treatment should be started during this phase. Phase III – Intractable sucking: Any finger sucking that persists from 6 or 7 years onwards should alert the dentist. Scientific evidence has shown that the best time to stop thumb sucking is between the ages of three and four, while many pediatric dentists maintain that the damage is reversible if the child stops before the appearance of permanent teeth, which occurs around ages five to six. When a child sucks his or her thumb (any of them), a powerful vacuum is created inside the mouth, which, at one time, was necessary for feeding [22-24].

This vacuum applies forces to the teeth in the upper and lower jaws, causing the teeth to change their position over time. As the child grows, the aspiration present in thumb sucking causes the roof of the mouth to be pushed up, and narrowed, leading to crossbite. Crossbite, malocclusion, and other conditions involving improper positioning of the teeth relative to the tongue can often cause children to develop speech disorders, or an inability to pronounce certain sounds.

The physical side effects of excessive finger sucking are

- Anterior open bite
- Increased overjet
- Lingual inclination of lower incisors and labial inclination of upper incisors
- Posterior crossbite
- Protractile tongue
- Deep palate
- Speech defects
- Finger defects (Finger eczema due to alternating dryness and moisture, and even angulation of the fingers)
- Mandibular retrusion
- Midline diastema

The effect on the development of dentofacial structures with the persistence of this habit depends on the frequency of the habit, duration, intensity of sucking, relationship of the dental arches, physical health of the child, and direction and nature of the force exerted by the finger. Pacifier Use Pacifier use by infants and children is certainly controversial, as attested by the medical and parenting literature [25-27].

For example, the World Health Organization recommends limiting pacifier use in part to promote breastfeeding and in part because of a positive relationship between pacifier use and incidence of middle ear infections and dental abnormalities. In contrast, the American Academy of Pediatrics recommends pacifier use during sleep in the first year of life as a preventive measure against sudden infant death syndrome (SIDS) (Niedenthal PM, 2015).

Several studies have found a protective effect of pacifiers on the incidence of sudden infant death, especially when used at the time of sleep. The mechanism of this apparently strong protective effect is still unclear. However, a decrease in arousal thresholds, a favorable modification of autonomic control during sleep, and maintenance of airway patency during sleep have been observed (Horne RS, 2015).

Pacifiers can affect teeth in the same way as thumb and finger sucking. However, pacifier use is often an easier habit to eliminate. Pacifier use has been significantly associated with posterior crossbite, especially when the habit lasted beyond 36 months. This relationship is thought to be due to the fact that the oral position of the pacifier leads to a displacement of the tongue over the jaw and an elongation of the orbicularis and buccinator muscles. These changes cause an increase in the transverse mandibular distance and a decrease in the transverse maxillary distance (Quiroga B., 2013) (Warren J., 2002) showed that prolonged pacifier use, 24 to 36 months, results in an increase in the prevalence of posterior crossbite at the age of 5 years when compared to the group with shorter sucking habits or no history of sucking. (Quiroga B., 2013) Likewise, the presence of open bites, increased overjet and Class II canine and molar relationship has been observed in these patients with primary dentitions (Martínez L, 2000).

Children who suck also suffer from alterations in the bacterial flora and hypertrophy of the lymphatic system, which is why they may present mouth breathing (Martínez L, 2000). It is recommended that pacifier sucking ceases at the latest at 2 years of age, since at that age there is self-recovery of the dentoskeletal damage caused by this habit. (Pietrzak P, 2012).

Oral breathing Oral breathing has a highly negative impact on general health, as well as consequences on facial and dental growth, developing malocclusions. Firstly, nasal breathing (which occurs in the nasal sinuses) is essential for the production of nitric oxide. (Jiang, J 2009) (Djupesland PG, 2001) Nitric oxide inhaled through nasal breathing has been shown to increase oxygen exchange efficiency and increase blood oxygen by 18%, while improving the lungs' ability to absorb oxygen. (Bian K, 2008).

Nitric oxide is also a strong vasodilator and brain transmitter that increases oxygen transport throughout the body and is vital for all organs in the body. Nitric oxide is crucial for the overall health and efficiency of smooth muscles such as blood vessels and the heart. (Ricciardolo FL, 2004) Nasal breathing provides the most efficient mechanism for introducing oxygen into the lungs and body for overall health benefit [28,29].

Mouth breathers may have a lower blood oxygen concentration than those who practice optimal nasal breathing, this low oxygen concentration has been linked to high blood pressure and heart problems.

The negative impact of oral breathing on the development of sleep disorders, growth and development in childhood has also been corroborated in many studies, triggering problems with weight and height, attention deficit at school, fatigue, behavioral problems and often diagnosed with attention deficit hyperactivity disorder (ADHD). (Ungkanont K, 2006), (Born J, 1988), (Raskin S,

2000) Other important problems in facial and dental development have been described due to oral breathing. According to various authors, children who present oral breathing require surgical treatment, since many times oral breathing is due to obstruction of blocked airways presenting swollen tonsils and adenoids [30].

Figure d

An example of enlarged tonsils, usually found in mouth breathers. (Jefferson Y, 2010) The role of the dentist is critical in the diagnosis and treatment of mouth breathing. General dentists and pediatric dentists may be in the best position to protect and treat patients who suffer from airway obstruction and subsequently trigger mouth breathing. Dentists often see patients periodically, and swollen tonsils are a clear sign of this type of condition that can be detected by clinical inspection. All patients who present one or more of the conditions listed in the table below should be examined and diagnosed for any type of sleep disorder or apnea (Jefferson Y, 2010)

Table. Signs of possible sleep apnea or sleeping disorder.

Long, narrow faces in older children, adolescents, and adults (sometimes not seen in younger children, since abnormal facial growth has not yet been expressed) (Fig. 2)
Adenoid facies that include pinched nostrils, open mouth, shortened upper lip, vacant and dull expression, and allergic shiner under the eyes (Fig. 3)
Narrow palate, high palatal vault, and dental crowding (Fig. 4)
Swollen tonsils (Fig. 5)
Small and slight stature for children; heavy and obese for adults (a neck circumference of ≥17 in. for men or ≥16 in. for women is an indication of potential sleep apnea)
Patients who snore or partially snore during sleep
Patients who sleep with their mouth open
Patients who are tired or irritable during the day
Patients who experience behavior problems
Patients who are unable to concentrate or do poorly in school
Patients who are easily winded from sports activities

Figure e

It is now believed that the diagnosis and treatment of oral breathing and all its associated problems should be handled under a multidisciplinary approach involving physicians, pediatric dentists and otolaryngologists. (Jefferson Y, 2010) As mentioned above the first line of treatment for patients with airway obstruction is surgery, subsequently when presenting narrow palates and high palatal vaults they may require additional orthopedic-dental treatment, these conditions result in narrow and compressed sinuses that can inhibit nasal breathing. (Gozal D, 1998).

This second line of treatment should be provided by dentists, who can correct facial and dental anomalies with functional appliances. Various functional appliances such as Frankel II and Herbst, have been used to stimulate the development of retrognathic jaws. These patients require palatal expansion to open the paranasal sinuses and allow efficient breathing. According to the literature, a combined therapy of adenotonsillectomy and palatal expansion significantly improves sleep quality and nasal breathing, alleviating ADHD symptoms. (Lawton HM, 2005).

Lip interposition-suction In cases of patients with lower lip interposition (or suction), the child rests the lower lip on the lower incisors, leaving the upper incisors between the lips. The upper lip is hypotonic, which, added to the muscular force of the hypertonic lower lip interposed between the upper and lower teeth, produces an anterior projection of the upper incisors. In the lower lip, there is an intense contraction of the quadratic muscles of the lip. There are times when both muscles are even joined through fibrous tissue, which makes it difficult to move the mandibular dentoalveolar process forward, generating a lack of anterior development of the lower arch [31].

This anatomical alteration produces at the dentoalveolar level, an effect similar to that of digital sucking, that is, an upper protrusion and a dental and mandibular retrusion. It is common for these patients with lower lip interposition to present certain common facial characteristics such as a marked mentolabial groove, a forced lip closure, hypertrophic orbicularis oris muscles and horizontal mandibular growth. At the intraoral level, protruded upper incisors and retruded lower incisors are observed, and an increased overjet (anteroposterior incisor overjet). (Muller K, 2014).

Figure f

Labial interposition at rest.

Figure g

Increased interincisal overjet and upper incisal proclination. Lip sucking is classified as a form of non-nutritive sucking. Similar to thumb sucking or pacifier sucking, when not outgrown by a certain age, lip sucking can contribute to dental development. Although not as frequent as thumb sucking or pacifier sucking, lip sucking is also frequently observed in children as a bad oral habit. (Hanson ML, 2003).

When lip sucking becomes a habitual habit in children, it has to be identified and prevention should be done to break the habit. In order to identify this habit certain clinical signs can be used as an indicator, such as red or cracked lips, constant lip wetting, teeth imprints on the lip, deep chin groove, protrusion of the upper front teeth or retrusion of the lower teeth.

The most frequent age for this habit is around 6-9 years, the age at which primary education begins, an age considered pre-adolescence, where physiological and psychological changes occur. Most children who exhibit this habit tend to suck their lips when they are nervous or anxious. Lip sucking does not usually represent a threat to the development of permanent teeth since it usually occurs sporadically. However, some lip sucking can be caused by the muscular imbalance that generally results in incompetent lips and this makes the child more prone to lip sucking. (Barberia E, 2006).

Children who tend to clearly exhibit negative lip seal or incompetent lips, as well as when asked to close their lips on purpose, show a wrinkled skin effect on the chin. Very often, many parents overlook the habit of lip sucking and even classify it as habitual, due to the little information available about this parafunctional habit and the consequences that can trigger such as developing malocclusions since it affects the correct development of the orofacial region. According to the study by DeCruz A. and collaborators, it was observed that children generally tend to suck more on their lower lip. This is also known as a variation of lip sucking or also known as the Mental Muscle Habit. In this condition, the lower lip is everted and only involves the vermilion border. This habit eventually results in an area of contraction between the lips and the chin that causes maxillary protrusion. (Decruz A, 2013).

There is also a relationship between the strong contraction of the lower orbicularis oris muscle and the mental muscle associated with the hypertonicity of the upper lip that has to be balanced by the lingual thrust during swallowing. This triggers a malocclusion due to persistence. (Barberia E, 2006) Lip sucking can be prevented with intraoral devices such as lip protectors or extraoral lip exercises such as lip-on-lip exercises. (Singh G, 2007).

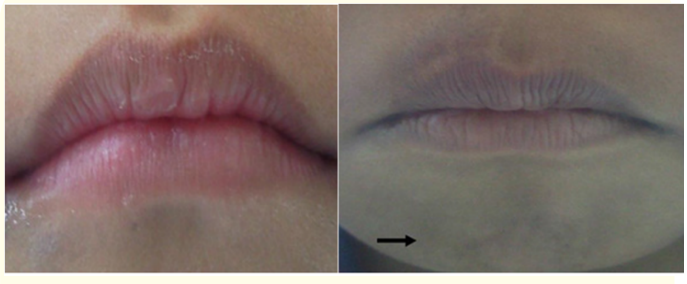

Figure h

Chapped lips (Barbiera E, 2006).

Wrinkled appearance in the symphysis area (Barbiera E, 2006).

Parents and dentists should never consider lip sucking as normal and it should be given the same attention, prevention and treatment as other oral habits. Due to the equally harmful effects of lip sucking, malocclusions can lead to malocclusions in children, so it is vitally important to take proper care to avoid it. (Decruz A, 2007) Relationship of habits with malocclusions Malocclusions represent 70% of oral cavity conditions and constitute an oral health problem [32].

According to the WHO, malocclusions occupy the 3rd place as an oral health problem; due to their prevalence and incidence, they are considered health problems.

The risk factors for dentofacial anomalies are certain morphological, structural or functional characteristics that give the person the susceptibility to suffer from them. Due to the complex etiopathogenesis of these anomalies, it is difficult to specify the risk factors involved in a specific pathology, since several can give rise to similar manifestations, although with variations, because each individual reacts in a particular way to the socio-environmental influence. In fact, the multifactorial nature of these anomalies is recognized, where fundamentally congenital factors interact, birth injuries, maternal illnesses during pregnancy, throat, nose and ear illnesses, premature loss of temporary teeth, muscular hypotonia, psychological problems, prolonged breastfeeding or bottle feeding, inadequate consistency and composition of the diet, traumas and deforming habits. Malocclusion is not an entity, it is the result of alterations in the stomatognathic system, that is, irregularities in teeth, bones, soft tissues and temporomandibular joints. (Paredes G,2005, Pruneda J,2015).

Prevention plays a fundamental role in avoiding malocclusions, having a fundamentally prophylactic objective. It includes the control of habits that are harmful to stomatognathic development; the use of space maintainers in cases of premature extraction of temporary teeth; the extraction of supernumerary teeth or any other factor that alters the eruptive pattern of permanent teeth and other mechanical or surgical measures that prevent malocclusion. (Van Maes HJ, 2015).

The multi-causal origin of these anomalies, as well as their appearance from an early age in the child's development, determine the need to carry out preventive programs, based on different measures and procedures, with the aim of reducing their incidence. (Fernández T, 2000 In recent years, stomatology has experienced a remarkable transformation by evolving from a mechanical phase to a scientific one, by applying a series of preventive measures that pursue, as a goal, the anatomical and physiological conservation of the tissues, and as a consequence, a better oral and general health. (González R, 2012).

It has been described that there is a close relationship between parafunctional oral habits and malocclusions, since an imbalance is caused in the stomatognathic system by harmful forces in addition to those exerted by the normal functions of the oral cavity. Among the harmful effects caused by parafunctional habits, we can mention at the dentoalveolar level: anterior open bite, protrusion, cross bite, among others. Additionally, we find that the habit of oral breathing can generate alterations such as: inadequate tongue posture, facial alterations such as an increased lower third of the face in a vertical sense, obtuse jaw angle, short upper lip, lip incompetence, in addition to postural alterations, frequent fatigue, daytime sleepiness, adynamia, low appetite and attention deficit. Depending on the findings, an interdisciplinary type of management is proposed, according to the needs of the patient in order to guarantee their growth process in better conditions (Grippaudo C, 2019, Di Francesco R).

Treatment Parafunctional habits mostly require interdisciplinary treatment, involving psychologists, speech therapists, orthopedists, orthodontists, otorhinolaryngologists and others. When this team is not available, aspects of the management of a patient's habit can easily be downplayed and omitted when planning treatment [33,34].

This omission becomes a predisposing factor to dentomaxillary alterations if the habits are not intercepted in a timely manner. In most cases, the dentist ignores the presence of the habit, focusing his treatment on resolving the consequence and not the cause. A wide variety of approaches and interventions have been described in the literature, ranging from the removal of the comforting object, by placing an orthodontic appliance to directly interfere with the habit, the application of an aversive taste substance to the digit, to behavior modification techniques (Al-Jobair 2004; Friman1986).

Some interventions are easier to implement than others, less disruptive to the child, their parents or carers and some are likely to be more applicable to a particular type of habit. (Borrie_FRP, 2015).

Interventions are likely to differ with respect to their

- Effectiveness in cessation of the habit.
- Ease for children to manage and ease of implementation from the parent/carer perspective;
- Time to stop the habit
- Reduction in the severity of the malocclusion. Interventions may include:
- Orthodontic appliances
- Barrier techniques - gloves/dressings etc.
- Chemical techniques - topical substances applied to the pacifier or finger

Figure i

- Behaviour modification techniques
- Any combination of the above.

Orthodontic deterrent device (Borrie_FRP, 2015) Orthodontic devices used to correct bad habits. It is common for the orthodontist's evaluation to emphasize dental, bone-dental, and skeletal relationships, leaving aside the neuromuscular function, but the rehabilitative role of orthodontics is aimed at ensuring that the stomatognathic apparatus functions under physiological conditions, and the musculature is the engine of functional activity.

This is why when identifying some of these bad oral habits in a patient, our treatment, in addition to eliminating the bad habit, must often include neuromuscular reeducation. For this purpose, there are some intraoral devices that help to recover the correct function. (Muller K, 2014) Quad helix anti-finger Fixed metal orthodontic appliance, consisting of two molar bands welded to a wire grill, which prevents the finger from touching the palate, thus preventing a vacuum from being created to hold the finger against the palate [35].

Figure j

(Muller, K, 2014) Lingual grid appliances This is a metal structure that is placed on the palate, at the level of the palatal wrinkles. This grid can be welded to metal bands that are cemented to the upper molars or it can be an attachment to a removable plate. Its function is to prevent the tongue from being placed in a position anterior to it, thus eliminating lingual interposition at rest and during swallowing.

Figure k

Note the wire mesh located behind the incisors that prevents the tongue from projecting between the teeth. (Muller K, 2014) Lip Bumper This is an appliance used in patients with lower lip interposition, designed to separate the tissues of the lower lip from the vestibular surface of the lower incisors, allowing neuromuscular re-education of the lip, putting it in a better position, so as not to press or interfere with the lower incisors, and thus facilitate lip closure. It can be attached to a removable appliance or can be fixedly soldered to bands cemented to the lower molars [36-38].

Figure l

Lip bumper orthodontic appliance used in labial interposition. Quad Helix Fixed metal orthodontic appliance, designed to achieve orthopedic expansion of the maxilla, is made up of a wire with four helical bends, welded to metal bands that are cemented to the upper molars. It is indicated in many mouth-breathing patients, when they have poor development of the nasal floor due to lack of transverse development of the maxilla [39].

(Muller K, 2014) Lower acrylic tongue-lifting plate This is a removable plate for partial use. Its function is to place the tongue in a higher position, using an acrylic flap that supports the tongue in a higher position than the one the tongue normally adopts on the floor of the mouth (in patients with a lowered tongue). This new lingual position allows the tongue-lifting muscles, which are normally contracted in the abnormal lowered position, to achieve the elongation that is favorable for tongue movements. The lingual

Figure m

frenulum also benefits by acquiring more mobility and elongation [40].

Figure n

Conclusion

There are multiple consequences that can be seen due to harmful habits or well-known as parafunctional in the stomatological system. In this work, several of those that are frequently diagnosed were described.

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Bibliography

1. Alemán Sanchéz and Pedro Carlos y otros. "Hábitos bucales deformantes y plano poslácteo en niños de 3 a 5 años". *Ciudad de la Habana* (2007): 44.

2. American Academy of Cosmetic Dentistry. Thumb sucking - stop it early. Madison: Pediatric Dentistry (1999).

3. Awpara S., *et al*. "Manejo de los hábitos orales en odontopediatría: Revisión de la Literatura". *Odontologia Pediatrica* 20.2 (2021): 74-84.

4. Barberia E., *et al*. "An Atypical Lesion Resulting from the Unhealthy Habit of Sucking the Lower Lip: Clinical Case Study". *Journal of Clinical Pediatric Dentistry* 30.4 (2006): 280-282.

5. Bian K., *et al*. "Vascular system: Role of nitric oxide in cardiovascular diseases". *The Journal of Clinical Hypertension (Greenwich)* 10.4 (2008): 304-310.

6. Born J., *et al*. "The significance of sleep onset and slow wave sleep for nocturnal release of growth hormone (GH) and cortisol". *Psychoneuroendocrinology* 13.3 (1988): 233-243.

7. Borrie FRP., *et al*. "Interventions for the cessation of non-nutritive sucking habits in children". *Cochrane Database of Systematic Reviews* 3 (2015): CD008694.

8. Butterworth G and Hopkins B. "Hand-mouth coordination in the new-born baby". *British Journal of Developmental Psychology* 6 (1988): 303-314.

9. Castilho S and Rocha MA. "Pacifier habit: history and multidisciplinary view". *The Journal of Pediatrics* 85.6 (2009): 480-489.

10. Cortese G., *et al*. "Biondia Relationship between dysfunctions and parafunctional oral habits, and temporomandibular disorders in children and teenager Pediatric". *Archivos Argentinos de Pediatria* 107.2 (2009): 134-138.

11. De Cássia Gonçalves R. "Ativador Elástico Aberto de Klammt no tratamento da má oclusao de Clase II 1". Universidade Estadual Paulista, Brasil (2007).

12. Decruz A., *et al*. "Prevalence of lip sucking amongst 6-9-years old children". *Padjadjaran Journal of Dentistry* 25.2 (2013): 79-82.

13. Di Francesco R., *et al*. "Respiração oral na criança: repercussões diferentes de acordo com o diagnóstico". *Revista Brasileira de Otorrinolaringologia* 70.5 (2004): 665-670.

14. Djupesland PG., *et al*. "Nitric oxide in the nasal airway: A new dimensión in otorhinolaryngology". *American Journal of Otolaryngology* 22.1 (2001): 19-32.

15. Enlow DH. "Crecimiento Maxilofacial". 2a edición, Interamericana (1984).

16. Fernández Torres CM. "Resultados del control de factores de riesgos de anomalíasdentofaciales. Clínica Estomatológica H y 21". *Revista Cubana de Ortodoncia* 15.1 (2000): 33-38.

17. Freud S. "Three essays on the theory of sexuality". *Freud Complete Works* 7 (1953): 617-663.

18. Friman PC. "Thumb sucking in childhood". *Feelings and their Medical Significance* 29 (1987): 11-14.

19. Gozal D. "Sleep-disordered breathing and school performance in children". *Pediatrics* 102.3 Pt 1 (1998): 616-620.

20. Grippaudo C., *et al*. "Association between oral habits, mouth breathing and malocclusion". *ACTA Otorhinolaryngologica Italica* 36.5 (2016): 386-394.

21. Hanson ML., *et al*. "Orofacial Myology: International Perspectives. 2nd edition. Springfield, Illinois: Charles C Thomas Pub. Ltd (2003): 317-318.

22. Horne RS., *et al*. "Sudden infant deathsyndrome: implications of altered physiological control during sleep". *Current Pediatric Reviews* 6.1 (2010): 30-38.

23. Humphrey T. "The development of human fetal activity and its relation to postnatal behavior". *Advances in Child Development and Behavior* 5 (1970): 1-57.

24. Indushekar GB., *et al*. "Childhood thumb sucking habit: the burden of a preventable problem!". *Journal of Dentistry, Medicine and Medical Sciences* 2.1 (2012): 1-4.

25. Jefferson Y. "Mouth breathing: Adverse effects on facial growth, health, academics, and behavior". *General Dentistry* (2010).

26. Jerez E., *et al*. "Evidencia del seguimiento de los hábitos parafuncioanles en la clínica integral del niño de la Universidad Santo Tomás de Bucaramanga, durante 2016 y 2017" (2019).

27. Jiang J., *et al*. "Nitric oxide gas phase release in human small airway epithelial cells". *Respiratory Research* 10.1 (2009): 3.

28. Jyoti S and Pavanalakshmi GP. "Nutritive and Non-Nutritive Sucking Habits - Effect onthe Developing Oro-Facial Complex; A Review". *Dentistry* 4 (2014): 203.

29. Kamdar R and Al-Shahrani I. "Damaging oral habits". *Journal of International Oral Health* 7.4 (2015): 85-87.

30. Lawton HM., *et al*. "A comparison of the Twin Block and Herbst mandibular advancement splints in the treatment of patients with obstructive sleep apnea: A prospective study". *European Journal of Orthodontics* 27.1 (2005): 82-90.

31. León Caballero KM., *et al*. "Factores de riesgo asociados con anomalías de oclusión en dentición temporal. Área III". *Revista Cubana de Estomatologia* 44.4 (2007): 4.

32. McNamara JA. "Influence of respiratory pattern on craniofacial growth". *The Angle Orthodontist* 51 (1981): 269-300.

33. Maguire JA. "The evaluation and treatment of pediatric oral habits". *Dental Clinics of North America* 44 (2020).

34. Martínez L., *et al*. "Uso del chupete: beneficios y riesgos". *Anales Españoles de Pediatria* 53.6 (2000): 580-585.

35. Medina Carmen and Y Otros. "Hábitos bucales más frecuentes y su relación con Malocusiones en niños con dentición primaria. Medina". *Revista Latinoamericana De Ortodoncia Y Odontopediatría* (2010).

36. Moreira T and Zurita T. "Atipical deglucion considered as a predisponent factor for maloclusion present in children with temporary or mixed dentition". *Revista Científicas de Especialidades Odontológicas* (2018).

37. Murrieta-Pruneda J., *et al*. "Prevalencia de hábitos bucales parafuncionales en niños de edad preescolar en Ciudad Nezahualcóyotl, Estado de México, 2009". *Boletín Médico del Hospital Infantil de México* 68.1 (2011):26-33.

38. Muller K and Piñeiro S. "Oral bad habits: neuromuscular rehabilitation and their influence incraniofacial growth". *Revista Médica Clínica Las Condes* 25.2 (2014): 380-388.

39. Niedenthal PM., *et al*. "Negative Relations Between Pacifier Use and Emotional Competence". *Basic and Applied Social Psychology* 34.5 (2012): 387-394.

40. Paredes Gallardo V and Paredes Censillo C. "Prevalencia de los hábitos bucales y alteraciones dentarias en escolares valencianos". *Anales de Pediatría* 62.3 (2005): 261-265.