

Relationship between feeding development and alterations in orofacial motor skills

Relación entre el desarrollo de la alimentación y alteraciones en la motricidad orofacial

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SUMMARY

Introduction: *The orofacial system is an anatomical-functional unit that enables the human being to perform various functions essential for life. It consists of oral structures, static and dynamic structures, and its harmonious functioning is based on the balanced relationship between its parts.*

Method: *A systematic review was carried out to find out the relationship between feeding development and orofacial motor disturbances. As a search strategy, equations were formulated with selected descriptors MESH and DECS (“feeding, infancy”, “orofacial motricity”, “phonoaudiology”, “pediatrics”), the databases consulted were Pubmed, Science Direct, Scopus, Redalyc, Dialnet, Scielo, Proquest, World wide science, Biomed Central, Red Iberoamericana de Innovación y Conocimiento Científico, Semantic*

Scholar, Revista Javeriana. The PRISMA methodology was used to locate, collect, analyze and synthesize the information. The criteria for inclusion in the sample were publications that addressed the study interest, in children from 0 months to 12 years of age suffering from brain alterations or pathologies; articles published in the last 10 years in Spanish, English, and Portuguese. Publications not related to mode and type of feeding, orofacial motor skills, and those whose population was contrary to the required characteristics were excluded.

Results: *A total of 1 058 667 studies were found, after screening, eligibility, and full-text review, 53 documents were selected corresponding to studies published from 2011 to 2021, related to the alterations of the orofacial structures and the factor associated with intervention type and feeding mode.*

Analysis and Discussion: *Exclusive breastfeeding and suckling favor the swallowing process and strengthen*

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all orofacial muscles, the difficulties that may occur in the different orofacial functions are rooted in a mechanical process that should be consolidated in the first days of life. Significant alterations of the facial structures are closely linked to orofacial myofunctional alterations, emphasizing the presence of craniofacial complexes.

Conclusions: *Possible alterations in the orofacial complex may originate from bad oral habits that affect anatomy and physiology. Since feeding is a process that unquestionably involves the functional exercise of the orofacial system, several risk factors are evidenced in relation to the functioning that implies multidisciplinary intervention directed to parents and caregivers.*

Keywords: *Nutrition, childhood, orofacial motor skills, speech therapy, pediatrics.*

RESUMEN

Introducción: *El sistema orofacial es una unidad anatómico-funcional que permite al ser humano realizar diversas funciones esenciales para la vida. Está formado por estructuras orales, estáticas y dinámicas, y su funcionamiento armónico se basa en la relación equilibrada entre sus partes.*

Método: *Se realizó una revisión sistemática con el objetivo de conocer la relación entre el desarrollo de la alimentación y las alteraciones motoras orofaciales. Como estrategia de búsqueda se formularon ecuaciones con descriptores seleccionados MESH y DECS (“feeding, infancy”, “orofacial motricity”, “phonoaudiology”, “pediatrics”), las bases de datos consultadas fueron Pubmed, Science Direct, Scopus, Redalyc, Dialnet, Scielo, Proquest, World wide science, Biomed Central, Red Iberoamericana de Innovación y Conocimiento Científico, Semantic Scholar, Revista Javeriana. Se utilizó la metodología PRISMA para localizar, recopilar, analizar y sintetizar la información. Los criterios de inclusión en la muestra fueron publicaciones que abordaran el interés del estudio, en niños de 0 meses a 12 años que sufrieran alteraciones o patologías cerebrales; artículos publicados en los últimos 10 años en español, inglés y portugués. Se excluyeron las publicaciones que no estuvieran relacionadas con el modo y tipo de alimentación, la motricidad orofacial y aquellas cuya población fuera contraria a las características requeridas. Resultados: Se encontraron 1 058 667 estudios, tras el cribado, la elegibilidad y la revisión del texto completo, se seleccionaron 53 documentos correspondientes a estudios publicados entre 2011 y 2021, relacionados con las alteraciones de las estructuras orofaciales y el factor asociado al tipo de intervención y al modo de alimentación.*

Análisis y Discusión: *La lactancia materna exclusiva y el amamantamiento favorecen el proceso de deglución y fortalecen toda la musculatura orofacial, las dificultades que pueden presentarse en las diferentes funciones orofaciales tienen su origen en un proceso mecánico que debe consolidarse en los primeros días de vida. Las alteraciones significativas de las estructuras faciales están estrechamente relacionadas con las alteraciones miofuncionales orofaciales, destacando la presencia de complejos craneofaciales.*

Conclusiones: *Las posibles alteraciones del complejo orofacial pueden tener su origen en malos hábitos orales que afectan a la anatomía y fisiología. Siendo la alimentación un proceso que involucra indiscutiblemente el ejercicio funcional del sistema orofacial, se evidencian varios factores de riesgo en relación con el funcionamiento que implica una intervención multidisciplinaria dirigida a los padres y cuidadores.*

Palabras clave: *Nutrición, infancia, motricidad orofacial, logopedia, pediatría.*

INTRODUCTION

The orofacial system is composed of static and dynamic structures, and its harmonious functioning is based on the balanced relationship between them (1). It is believed that the functions involving the orofacial apparatus (sucking, breathing, speaking, chewing, swallowing) are the most influential factors in the pattern of maxillofacial development and the position of teeth in the child’s arch (2).

These structures are related to vital and social functions directly intertwined with survival. In this sense, changes in any of them can cause a general imbalance in this system, leading to difficulties in daily living and consequently in the quality of life (3).

Nutrition is one of the main determinants of human health, it has an impact on the different contexts that surround it and is related to a healthy and active life (4). The child requires special attention from birth in their diet because it is the basis for growth, development, and maintenance of the vital state of the human being (5). During the first months, a baby faces a phase of rapid growth, which is largely determined by early childhood practices and complementary feeding (6).

For such reason, the World Health Organization (WHO) and the American Academy of Pediatrics (AAP) recommend exclusive breastfeeding for the first 6 months after birth with a continuation of this while gradually introducing solid foods into the infant's diet for 1 year or longer as mutually desired by mother and infant. In 2016, the United Nations (UN) Office of the High Commissioner for Human Rights stated that breastfeeding is a human rights issue for both mothers and children, therefore, it should be protected and promoted for the benefit of both. Infant feeding categories, often referred to as breastfeeding definitions, form the basis for describing infant feeding patterns, especially the duration of breastfeeding and the degree of exclusivity of breastfeeding, after which breastfeeding is recommended (7), after which the introduction of local nutrient-rich complementary foods is recommended (8).

During natural lactation, some masticatory muscles begin their maturation and positioning, such as the temporalis (activated in mandibular retrusion) (9), the lateral pterygoid (necessary during propulsion), the mylohyoid (mainly responsible for swallowing), and the masseters (activated in sucking mechanics) (10), the mylohyoid (mainly responsible for swallowing) and the masseters (activated in sucking mechanics) (10), while the orbicularis oris of the upper and lower lips guide the growth and development of the anterior region of the stomatognathic system (11), being responsible for the maturation of the masticatory muscles (12). The upper and lower orbicular orbicular orbicularis oculi are responsible for stimulating the development of the jaws and differentiating the temporomandibular joints, which helps to prevent the development of parafunctional oral habits and malocclusions (13). That is to say, breastfeeding has a decisive role in the structure and functional conformation of the orofacial system; being the first function that provides information on paratypic growth, as well as transverse growth actions (14). Likewise, actions of transversal growth of the skull and face (15).

The sucking reflex is the first coordinated muscular activity performed by the newborn (16). There are two forms of sucking: the first is nutritive sucking, which occurs through natural feeding

and provides the infant with essential nutrients for optimal growth and development (17). It also constitutes the most important exchange with the outside world, in addition to feeding, the child receives a sense of well-being, satisfying those requirements of security and love by establishing physical contact with its mother. The second is non-nutritive sucking, with which the child seeks to generate this feeling of calm, warmth, and security through substitutes (7). The early transition from breastfeeding and non-nutritive sucking habits may be related to occlusal-facial problems (18).

Despite the benefits of breastfeeding, worldwide it has been estimated that only 34.8% of infants are exclusively breastfed during the first six months of life, while the majority receive some other type of food or liquid during this period (19).

In Colombia, public policies have been formulated in favor of breastfeeding, including the Ten-Year Breastfeeding Plan 2010-2020, which establishes as imperative "the protection of the nutrition of children under two years of age, within the framework of the development of the National Food and Nutritional Security Policy" (20).

Thus, the mother's choice of the type and duration of feeding has a direct influence on the timing of oral habits (21). Because feeding is a complex process that requires a coordinated interaction between the nervous, cardiopulmonary, gastrointestinal, and oropharyngeal systems (22). Hence, in the first months of life, children prepare their organism and orofacial structures for the chewing process to be carried out later on. For this purpose, their diet includes foods that are easy to chew such as liquids, semi-solids, and finally solids (23), which will allow the strengthening and development of the facial bone-muscular musculature, which is of great importance for the development of speech (24).

In view of the above, it is pertinent to know how feeding stimulation intervenes in the development of orofacial motor skills in infants to contribute to the clinical intervention processes of swallowing in childhood.

MATERIAL AND METHODS

A systematic review on feeding stimulation and its intervention in the development of orofacial motor skills in infants was carried out from September to December 2021. The PRISMA methodology was used to locate, collect, analyze and synthesize the information. Search equations were performed using selected descriptors MESH and DECS (“feeding, infancy”, “orofacial motricity”, “phonoaudiology”, “pediatrics”). Databases consulted: Pubmed, Science direct, Scopus, Redalyc, Dialnet, Scielo, Proquest, World wide science, Biomed central, Red Iberoamericana de Innovación y Conocimiento Científico, Semantic Scholar, Revista Javeriana.

The criteria for inclusion in the sample were publications that addressed information on the relationship between feeding and orofacial motor skills in children from 0 months to 12 years of age, children with brain disorders or pathologies, and articles published in the last 10 years in Spanish, English, and Portuguese. Publications not related to mode and type of feeding and orofacial motor skills were excluded, as well as those whose population was contrary to the required characteristics.

The organization and selection of articles were broken down by applying the selection criteria proposed in the PRISMA methodology (25) methodology, as shown in Figure 1.

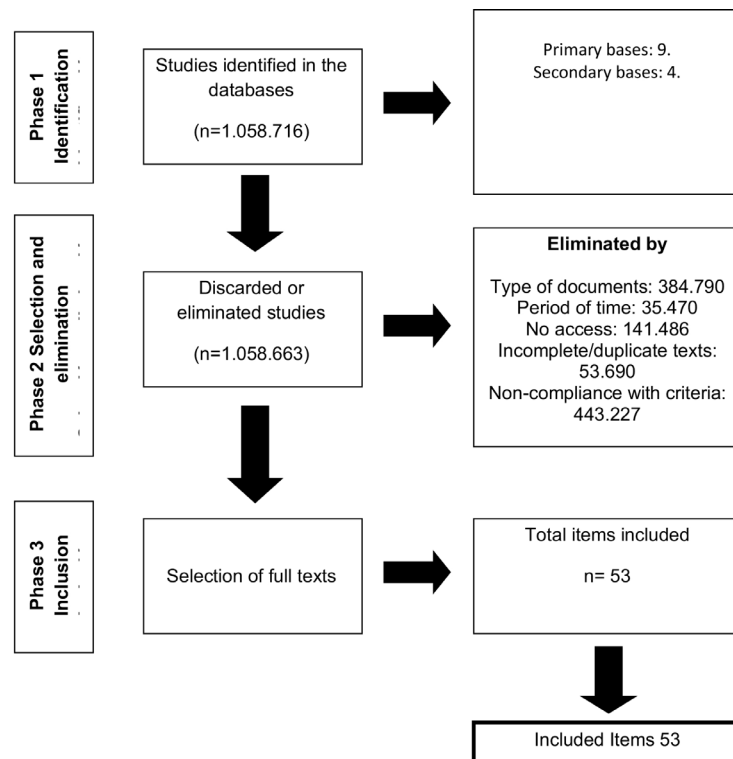


Figure 1. Phases of the review.

- a. Identification phase: This comprises the total number of records identified according to the search in the 13 databases. For the search strategy, descriptors were selected in DeCS and MeSH from which equations were constructed and implemented in the aforementioned databases.
- b. Screening Phase: In this phase, duplicate articles and those that did not meet eligibility criteria or proposed inclusion criteria were removed.
- c. Eligibility Phase: After reading the title and abstract of the articles, we proceeded with the selection, applying the proposed exclusion

guidelines. Differences in the criteria of the articles were resolved by discussion among the authors.

- d. Inclusion phase: The complete texts were read, extracting relevant aspects that answered the PICO question.

RESULTS

The results of the described process are presented below:

A total of 1 058 667 studies were found, after screening, eligibility, and full-text review, 49 documents corresponding to primary bases and 4 articles from secondary bases were selected for a total of 53 selected studies published from 2011 to 2021. In Table 1 are the 53 selected studies (pages S490 to S497).

The contributions of the 53 selected studies were considered, highlighting the evidence and results concerning the intervention of food stimulation in the development of orofacial motor skills. Among them, the study of complementary feeding in premature infants concluded that optimal nutrition in the first 1 000 days, from conception to the second year of life, has the potential to shape individual health status during childhood and adulthood (17,18).

The clinical processes of care for the development of orofacial motor skills and swallowing in childhood could begin with prenatal care consultations (ANC) so that health professionals can orient and prepare pregnant mothers to initiate breastfeeding one hour after delivery and promote exclusive breastfeeding for 6 months (36,41).

Feeding stimulation is part of the multidisciplinary treatments for difficulties in sucking, swallowing, malocclusion, and tongue and lip posture related to breathing, posture, and tonicity of the phonoarticulatory organs necessary for communication and chewing (3).

The development of alterations of the orofacial system and functional oral habits is related to eating habits. Parents are fundamental actors in the intake of nutritious and varied food, structuring schedules and meal times, as well as generating environments that facilitate feeding, especially in the first years of life (53).

DISCUSSION

In this sense, after identifying the relationship between the health problem (alteration of the orofacial structures) and the factor associated with the intervention (type and mode of feeding) described above, it is incontrovertible within an explanatory scheme to pose the corresponding information in a solid way. In the first place, it is understood that the orofacial system is a physiological, integrated, and coordinated anatomofunctional unit, constituted by a set of craniofacial and cervical structures (54) that in some way allows the human being to perform several indispensable functions for life, within these, it is possible to mention functions such as respiration, suction, swallowing, speech, phonation (35).

In addition, the orofacial system is composed of bony structures such as the skull, facial bones, hyoid bone, larynx, maxilla, mandible, and bony palate. It also consists of muscles such as masticatory, facial expression, tongue, soft palate, pharynx, and neck muscles (49). Thus, it would be considered a morpho-functional biological unit integrated by the combined structures of the mouth and jaws, which are organized according to their activity, and work perfectly.

The combined bony structures of the mouth and jaws-structures such as the skull, facial bones, hyoid bone, larynx, maxilla, mandible and bony palate, muscles such as those of mastication, facial expression, tongue, soft palate, pharynx, and neck (49) form an integrated morpho-functional biological unit that is organized according to their activity, working in perfect harmony (55).

Feeding in early childhood is a process that involves the participation of two or more actors (the child and the accompanying adults), based on the interaction between those who receive the food and those who offer it (56). The ingestion of the different nutrients contained in the foods that make up the diet is subordinated to this process. Therefore, nutrition depends on the feeding process and this, in turn, depends on the interaction appropriate to the situation. Parents are responsible for providing their children with nutritious and varied food, structuring meal times and schedules, as well as creating an environment that facilitates feeding, especially in the first years

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Table 1. Selected studies: feeding stimulation is involved in the development of orofacial motor skills in infants.

| N° | CROSSING | DATABASE | ORIGINAL/TITLE | URL | AUTHOR | YEAR | CONTRIBUTION |
|----|------------------------|----------------|---|---|---|------|---|
| 1 | ("Food" + "Childhood") | PUBMED | Prevalence of problematic feeding in young children born prematurely: a metaanalysis. | https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7936467/ | Britt Frisk Pados, Rebecca R. Hill, Joy T. Yamasaki, Jonathan S. Litt, and Christopher S. Lee | 2021 | Problem feeding after neonatal discharge involves the infant being unable or unwilling to eat and/or drink enough safely to obtain adequate nutrition and hydration, despite the availability of food. The specific symptoms of problem feeding change during the first few years of life as infants move from a liquid diet (i.e., breast milk or infant formula) to early complementary foods and then to more complex foods. As the skills needed for successful eating change, so do the symptoms of problems. Symptoms of problem feeding may include behaviors such as refusing to eat appropriate volumes or developmentally appropriate varieties of foods; symptoms of dysphagia or aspiration, such as coughing, choking, gagging, or respiratory compromise; problem feeding behaviors, such as increased stress, crying, irritability, or strict requirements for success at mealtime; or delayed eating skills, such as difficulty chewing. (26). |
| 2 | ("Food" + "Childhood") | SCIENCE DIRECT | Validation of the Childhood Dysphagia Management Scale (CDMS): an impact scale to determine the medical home for dysphagia. | https://www.sciencedirect.com/science/article/abs/pii/S0165587621001099?via=ihub | Jennifer Maybee, Arwen Jackson, Kristine Wolter-Warmendamm, Francis Hickey, Jeremy Prager, Emily DeBoer. | 2021 | The results and recommendations of instrumental swallowing evaluations do not, by themselves, guide the type of medical treatment that might be necessary for pediatric patients with dysphagia (27). |
| 3 | ("Food" + "Childhood") | DIALNET | Feeding difficulties in early childhood and their relationship to parental feeding practices. | https://dialnet.unirioja.es/servlet/articulo?codigo=6625838 | Laura Andrea Castaño Tobón, Mariana Molano Vargas, María Teresa Varela Arévalo, Mariana Molano Vargas, María Teresa Varela Arévalo | 2018 | Feeding in early childhood is a process that involves the participation of two or more actors (the child and the accompanying adults), based on the interaction between the one who receives the food and the one who offers it. The ingestion of the different nutrients contained in the foods that make up the diet is subordinated to this process. Therefore, nutrition depends on the feeding process and this, in turn, depends on the interaction appropriate to the situation. Parents are responsible for providing their children with nutritious and varied foods, structuring meal times and schedules, as well as creating an environment that facilitates feeding, especially in the first years of life, considering that the family is the primary context of socialization. However, this responsibility can generate emotional discomfort and difficulties in the bond with their children when the feeding situation (SDA) is not achieved or is tense. (28). |
| 4 | ("Food" + "Childhood") | SCIELO | Avoidance and Restrictive Food Intake Disorder (ARFID): What the Pediatrician Should Know | https://www.scielo.cl/scielo.php?script=sci_arttext&pid=S2452-6055202100020029&lang=es | Valeria De Torro , Karina Aedob , Pascuala Urreola | 2021 | Feeding is a complex process that requires a coordinated interaction between the nervous, cardiopulmonary, gastrointestinal, and oropharyngeal systems. This coordination also requires acquired skills appropriate to the child's developmental stage and occurs within the text of the caregiver-child dyad, so feeding disorders may be the manifestation of a disturbance in any of the areas described above. This process can have consequences on both the child, in terms of physical, social, emotional, and/or cognitive function, and on the caregiver, increasing stress and leading to mental health pathology. (23). |
| 5 | ("Food" + "Childhood") | SCIELO | The expectation of parental control and maintenance of bottle feeding in infancy | https://www.scielo.br/ijped/a/nvWWdWzRGDX7xw15HWBBG8C/?lang=en | Adriana Dantas Costa, Elaine Pereira da Silva Tagliaro, Eliana Dantas Costa, Gláucia Maria Bovi Ambrosiano, Rossana de Fátima Possobon. | 2021 | The mother's choice of type and duration of feeding has a direct influence on the timing of oral habits, including the use of bottles. This puts children's health at risk, considering its interference in craniofacial development and the functions of breathing, swallowing, phonation and mastication. (22). |

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Table 1. Selected studies: feeding stimulation is involved in the development of orofacial motor skills in infants (continue from page S490).

| N° | CROSSING | DATABASE | ORIGINAL TITLE | URL | AUTHOR | YEAR | CONTRIBUTION |
|----|-------------------------------------|--------------------|---|---|--|------|---|
| 6 | ("Food" + "Childhood") | SCIELO | Oral motor dysfunction and feeding difficulties during complementary feeding in preterm infants. | https://www.scielo.br/j/codas/a/Hn7vT9n6M6NhvIQxm36vhtG/?lang=pt | Carla Steinberg Larissa Menezes, Ana Caline Nobrega | 2021 | Exclusive breastfeeding should take place until six months of life, when the introduction of complementary feeding should begin, which comprises the period in which the infant is offered any nutritious food (solid or liquid) in addition to breast milk or infant formula. Despite the paucity of evidence on the best time to initiate it in preterm infants, it is recommended that it should be done from six months of corrected age. (29). |
| 7 | ("Food" + "Childhood") | WORLD WIDE SCIENCE | Formula feeding practice and associated factors among mothers with infants 0-6 months of age in Addis Ababa, Ethiopia: a community-based cross-sectional study. | https://iponline.biomedcentral.com/articles/10.1186/s13052-021-01010-x | Alemesh Abebe Taye, Wondwosen Asegidew, Mitiku Mammo Taderegew, Yonas Girma Bizawork, Betregionis Zegeye | 2021 | The World Health Organization (WHO) and the American Academy of Pediatrics (AAP) recommend exclusive breastfeeding for the first 6 months of life with a continuation of breastfeeding while gradually introducing solid foods into the infant's diet for 1 year or longer as mutually desired by mother and infant. In 2016, the United Nations (UN) Office of the High Commissioner for Human Rights stated that breastfeeding is a human rights issue for both mothers and children and should be protected and promoted for the benefit of both. The introduction of local nutrient-rich complementary foods is recommended thereafter with continued breastfeeding for 2 years of age and beyond. (9). |
| 8 | ("Food" + "Childhood") | SCIELO | Skin to skin contact and the early initiation of breastfeeding: a cross-sectional study. | https://www.scielo.br/j/tee/a/y8ZXSdn8zmq3WXTpQInRtSt/?lang=en | Kadja Elvira dos Anjos dos Anjos Silva Araújo, Camila Carvalho dos Santos, Maria de Fátima Costa Camin-ha, Suzana Lins da Silva Juliana De Castro Nunes Pereira, Malaquias Batista | 2021 | The first 60 minutes of life represent a time of critical changes in which the newborn (NB) must rapidly adapt to physiological changes in important systems such as the cardiovascular, respiratory, immune, and metabolic systems. This first hour, also called the golden hour, is important because of its relevance to the growth and development of the child, providing immediate and long-term health benefits. (5). |
| 9 | ("Feeding" + "orofacial motricity") | SCIENCE DIRECT | Speech pathology telepractice intervention during the COVID-19 pandemic for Spanish-speaking children with cleft palate: A systematic review. | https://www.sciencedirect.com/science/article/pii/S0165587621000938 | Mirta Palomares, Aguilera Felipe Inostroza, Allende Loreley Riquelme Solar | 2021 | Approximately 400 children are born each year with cleft lip and palate, one of the most common congenital malformations in our country. Depending on the type of cleft, several vital functions may be affected, such as diet, social and psychological aspects, hearing, speech, language, and voice. During the early years, children with cleft palate have difficulties with oral expression, speech, and voice. The literature describes these difficulties due to the negative impact on the communicative, linguistic, cognitive, school, and social development of children. (30). |
| 10 | ("Feeding" + "orofacial motricity") | PUBMED | Relationship between Breastfeeding and Malocclusion: A Systematic Review of the Literature. | https://pubmed.ncbi.nlm.nih.gov/33265907/ | Andrea Abate , Davide Cavagnetto, Andrea Fama, Cinzia Maspero, Gianpietro Farronato | 2020 | The stomatognathic system is composed of static and dynamic structures and its harmonious functioning is based on the balanced relationship between them. It is believed that the functions involving the stomatognathic apparatus (sucking, breathing, speaking, chewing, swallowing) are the factors that most influence the pattern of maxillofacial development and the position of the teeth in the child's arch. (2). |
| 11 | ("Feeding" + "orofacial motricity") | SCIENCE DIRECT | Feeding swallowing difficulties in the first three years of life: A preterm and full-term infant comparison. | https://www.sciencedirect.com/unipamplona/basesdedatos/proxy.com/science/article/pii/S1355184118300486 | Emily Zimmerman, Austin Rosner | 2018 | Eating and swallowing difficulties significantly impact nutritional status and the development of speech, language, social behavior, emotions, and cognition. Because coordination of oral structures is necessary for both feeding and language skills, it has been suggested that a relationship exists between these complex oral motor tasks. In fact, early feeding behaviors may be useful in predicting later speech and language development. (31). |

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Table 1. Selected studies: feeding stimulation is involved in the development of orofacial motor skills in infants (continue from page S491).

| N° | CROSSING | DATABASE | ORIGINAL TITLE | URL | AUTHOR | YEAR | CONTRIBUTION |
|----|-------------------------------------|--------------------|---|---|--|------|---|
| 12 | ("Feeding" + "orofacial motricity") | SCIENCE DIRECT | Ankyloglossia and sucking problems, multidisciplinary treatment: orofacial myofunctional therapy, breastfeeding sessions, and frenotomy. | https://amamantarasturi-as.org/wp-content/uploads/2020/03/Anquiloglosia-y-problemas-de-suc-cio%CC%81n.pdf | Tomas Pastor-Vera, Paula Rodríguez-Alessi, Elvira Ferrés-Amad, Eduard Ferrés-Padró | 2016 | Limited lingual mobility in neonates can also lead to difficulties in sucking and latching on to the breast. (13). |
| 13 | ("Feeding" + "orofacial motricity") | SCIENCE DIRECT | Swallowing problems in children with a tracheostomy | https://www.sciencedirect.com/science/article/pii/S105585862100041X | Bas Pullens Marloes Streppel | 2021 | Adequate swallowing function is essential for feeding, growing, and thriving. Children with swallowing problems are at risk for malnutrition, behavioral delay, and stressful caregiver interaction (16). |
| 14 | ("Feeding" + "orofacial motricity") | SCIENCE DIRECT | Breastfeeding and language outcomes: A review of the literature. | https://www.sciencedirect.com/science/article/pii/S0021992415000258#sec0065 | Jamie Mahurin Smith | 2015 | For most children, speech and language development proceeds smoothly without parental concern or outside assistance. (32). |
| 15 | ("Feeding" + "orofacial motricity") | SCIENCE DIRECT | Birth prevalence of orofacial cleft in a tertiary hospital in Riyadh, Saudi Arabia: A retrospective audit. | https://www.sciencedirect.com/science/article/pii/S1013905221000869#s0005 | Wasmiya A. AlHayyan aSamar Al Hayek bSarah S. AlOtabi cShahad A. AlGhamim | 2021 | Orofacial clefts, particularly cleft lip and cleft palate, are the most common congenital deformities among newborn infants. (14). |
| 16 | ("Feeding" + "orofacial motricity") | SEMANTIC SCHOLAR | Breastfeeding and its relationship with psychomotor development in children aged 2 to 5 years living in the Villa Ej Libertador neighborhood of the city of Córdoba, the year 2017. | http://pa.bibdigital.ucc.edu.ar/1474/1/TF_Cheble_Fernandez.pdf | CHEBLE, Camila Anastasia, FERNÁNDEZ, Daniela María | 2018 | Breast milk is the optimal food in this first stage. It ensures that the union existing during pregnancy is maintained, contributing to the emotional balance of the mother and child; It ensures the best development since it is a specific product with a composition different from any other animal milk, which changes according to the needs of the infant. It also protects their health through the transfer of cells, growth factors, enzymes, and immunoglobulins, which results in fewer infections (respiratory, intestinal, meningitis, urinary) which are less frequent not only because of the benefits of breast milk but also because it avoids exposure to contaminated water, food and bottles. (10). |
| 17 | ("Feeding" + "orofacial motricity") | JAVERIANA MAGAZINE | Influence of breastfeeding on the development of parafunctional habits and malocclusions. Cross-sectional study | https://revistas.javeriana.edu.co/index.php/revUnivOdontolgi-ca/article/view/14240 | Mariana Carolina Morales-Chavez, Rosa M. Stabile-Del Vecchio | 2014 | The sucking reflex is the first coordinated muscular activity performed by the newborn. There are two forms of sucking: the first is nutritive sucking, which occurs through natural feeding and provides the infant with essential nutrients for optimal growth and development. It is also the most important exchange with the outside world since, in addition to feeding, the infant receives a sense of wellbeing by satisfying those requirements of security and love and by establishing physical contact with its mother. The second is non-nutritive sucking, with which the child seeks to generate this feeling of calm, warmth, and security through substitutes. Breastfeeding promotes adequate growth and development of the craniofacial structures since it produces excitation of the orofacial musculature and stimulates the functional and harmonious development of the stomatognathic system. It is responsible for maturing the muscles of mastication, as well as stimulating the development of the jaws and differentiating the temporomandibular joints, which helps to prevent the appearance of parafunctional oral habits and malocclusions. (17). |

(continue on page S493).

Table 1. Selected studies: feeding stimulation is involved in the development of orofacial motor skills in infants (continue from page S492).

| N° | CROSSING | DATABASE | ORIGINAL TITLE | URL | AUTHOR | YEAR | CONTRIBUTION |
|----|-------------------------------------|----------|---|---|---|------|--|
| 18 | ("Feeding" + "orofacial motricity") | DIALNET | Persistence of soft diet in children attending a pediatric dentistry service in Cali. | https://dialnet-unirioja-es.unipamplona.basesdedatoszproxy.com/servlet/articulo?codi-go=5560676 | Martha Inés Torres Arango | 2015 | During the first months of life, children are preparing their organism and orofacial structures for the chewing process to take place later on. For this purpose, their diet includes foods that are easy to chew such as liquids, semisolids, and finally solids, which will allow the strengthening and development of the facial bone-muscle musculature, of great importance for the development of speech. (33). |
| 19 | ("Feeding" + "orofacial motricity") | DIALNET | Prolonged breastfeeding and language development: a review of the literature. | https://dialnet-unirioja-es.unipamplona.basesdedatoszproxy.com/servlet/articulo?codi-go=5774432 | Katty Gittens Dixon | 2017 | Breastfeeding is one of the main characteristics that identify mammals, to which group human beings belong, and which can mean the difference between life and death of the offspring. According to data from the World Health Organization and the United Nations Children's Fund (UNICEF), optimal breastfeeding of infants up to two years of age is more beneficial than any other type of intervention. (34). |
| 20 | ("Feeding" + "orofacial motricity") | DIALNET | Speech production in two occlusal classes | https://dialnet-unirioja-es.unipamplona.basesdedatoszproxy.com/servlet/articulo?codi-go=6338460 | Luis M. T. Jesus; André Araújo; Isabel M. Costa | 2014 | Speech is the most widely used mode of communication in all human cultures (except, of course, the deaf culture) and is composed of an inventory of sounds produced by actions of the articulatory and phonatory systems. (35). |
| 21 | ("Feeding" + "orofacial motricity") | SCOPUS | Relationship between breastfeeding and malocclusion: a systematic review of the literature. | https://www.mdpi.com/2072-6643/12/5/3688 | Andrea Abate, Davide Cavagnetto, Andrea Fama, Cinzia Maspero, Gianpietro Farronato | 2020 | The stomatognathic system is composed of static and dynamic structures and its harmonious functioning is based on the balanced relationship between them. The functions included in it (sucking, breathing, speaking, chewing, swallowing) are the factors that most influence the pattern of maxillofacial development and the position of the teeth in the child's arch. (2). |
| 22 | ("Feeding" + "orofacial motricity") | REDALYC | Breastfeeding, metabolic programming and its relationship with chronic diseases | https://cientificas.uninorte.edu.co/index.php/salud/article/view/8923/214421443163 | Carlos Román Collazo, Yenima Hernández Rodríguez, Diego Andrade Campoverde | 2018 | Adequate neonatal and infant nutrition is essential to ensure that the development of the organism reaches its full potential for growth and health. Several studies report deficient practices in neonatal nutrition in terms of early replacement of breastfeeding with complementary feeding. Worldwide, it has been estimated that only 34.8% of infants are exclusively breastfed for the first six months of life, while the majority receive some other type of food or liquid during this period. (36). |
| 23 | ("Feeding" + "orofacial motricity") | REDALYC | Application of key practices: breastfeeding, complementary feeding, micronutrients, mental and social development of children under 5 years of age. | https://www.redalyc.org/journal/2738/273865670009/273865670009.pdf | Madero-Zambrano, Kendy; Marsiglia-López, Diana; Ruidiaz-Gómez, Keydis; Rivera-Gómez, Julieth | 2021 | Childhood health is fundamental for the development of human beings since it has an impact on the rest of their lives. However, because of their young age, they depend to a great extent on the decisions of their parents for their health care; that is why Comprehensive Management of Childhood Illnesses (IMCI) in Colombia seeks to involve the family, community, and health institutions to reduce infant morbidity and mortality, through the education of health personnel, community mothers, teachers, parents and/or caregivers on the prevention of diseases prevalent in childhood, as well as promoting and reinforcing protective factors such as breastfeeding, nutrition, immunization, and affection. (37). |
| 24 | ("Feeding" + "orofacial motricity") | SCIELO | Relationship between sensory processing and the stomatognathic system of oral breathing infants. | https://www.scielo.br/fj/codas/a/yRRKqntSx59xCdXFyT6hJG/?lang=pt | Dantas, Ana Carollyne, de Lima Raquel; Albuquerque, Daniele; Andrade da Cunha, Camilla; Dantas de Lima, Alberta; Lima, Sandro; da Silva, Hilton | 2022 | The altered mode of breathing leads to increased exposure of the upper airway, causing inadequate development of the craniofacial complex, associated with abnormal functions of chewing, swallowing, tongue, and lip posture. In addition to problems with breathing, chewing, swallowing, posture, and tonicity of the phonoarticulatory organs. (3). |

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FEEDING DEVELOPMENT AND ALTERATIONS IN OROFACIAL MOTOR SKILLS

Table 1. Selected studies: feeding stimulation is involved in the development of orofacial motor skills in infants (continue from page S493).

| N° | CROSSING | DATABASE | ORIGINAL TITLE | URL | AUTHOR | YEAR | CONTRIBUTION |
|----|-------------------------------------|--------------------|--|---|--|------|--|
| 25 | ("Feeding" + "orofacial motricity") | SCIELO | Deforming oral habits and dental malocclusions in children 5-11 years old. Matanzas, 2006 | http://scielo.sld.cu/scielo.php?script=sci_arttext&id=S1684-18242014000400002&lang=es | María Carmen Álvarez González, Aleida Pérez Lauzurique, Isabel Martínez Brito, Mayelín García Nodar, Roberto Suárez Ojeda, | 2014 | Oral habits can alter the normal development of the stomatognathic system, cause an imbalance between muscular forces and lead to the appearance of deformity. These habits modify the position of the teeth, and the relationship and shape of the dental arches to each other, interfering with the normal growth and function of the oral and facial musculature. (38). |
| 26 | ("Feeding" + "orofacial motricity") | SCOPUS | Relationship between type of breastfeeding and atypical swallowing in patients attending a pediatric dentistry clinic. | https://revistas.uem.es/index.php/RLQG/article/view/68420 | Miguel Vargas García, Paola Eusse Solano, Jimmy Alvarado Meza | 2021 | From the speech-language pathologists' point of view, breastfeeding has a decisive role in the structure and functional conformation of the stomatognathic system; being the first function that provides paratyptic-growth information. Some authors mention that the movements of mandibular equilibrium, typical of breastfeeding, generate excitation on the temporomandibular joint, providing the structure with paratyptic stimuli of longitudinal growth, generating actions of transversal growth of the skull and face. (39). |
| 27 | ("Feeding" + "orofacial motricity") | SCIELO | Long-term growth patterns in children born with cleft lip and/or cleft palate. A systematic review | https://scielo.isciii.es/scielo.php?script=sci_arttext&id=S0212-16112021000200410&lang=es | Rocío Gallego, Iris Iglesias-Altaba, Luis A Moreno, Gerardo Rodríguez | 2021 | Patients with unilateral or bilateral complete cleft lip as well as cleft palate will have difficulty feeding because the cleft lip may compromise sucking during breast-feeding and the cleft palate may cause milk to pass into the nasal cavity. Therefore, a number of recommendations for feeding these children should be taken into account, such as assessment of sucking ability, teaching proper breastfeeding position, adaptive feeding equipment (specific bottles and nipples), and family education on infant nutrition. (40). |
| 28 | ("Food" + "Speech") | PUBMED | Complementary Feeding in Preterm Infants: A Systematic Review. | https://pubmed.ncbi.nlm.nih.gov/32575713/ | Nadia Liotto, Francesco Cresi, Isadora Bagnetti, Paola Roggero, Camilla Menis, Luigi Corvaglia, Fabio Mosca, Arianna Aceti | 2020 | Optimal nutrition in the first 1000 days, from conception through the second year of life, has the potential to shape individual health status throughout childhood and adulthood. The relationship between nutrition in early life and long-term outcomes is particularly relevant for premature infants, whose intrinsic immaturity makes nutritional management a daily challenge for neonatologists (18). |
| 29 | ("Food" + "Speech") | WORLD WIDE SCIENCE | The quality of maternal nutrition and infant feeding counseling during antenatal care in South Asia | https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8189234/?tool=pmcentrez&report=abstract | Harriet Torlesse, Rukundo K. Benedict, Hope C. Craig, and Rebecca J. Stoltzfus | 2021 | Prenatal care (ANC) enables health professionals to prevent, identify, and treat conditions that may threaten the health of a pregnant woman and her fetus or newborn. Maternal underweight, obesity, and micronutrient deficiencies can jeopardize the survival, health, and wellbeing of pregnant women, as well as the growth, development, and survival of their infants. For this reason, the World Health Organization's 2016 ANC guidelines include recommendations to counsel pregnant women on healthy eating and staying physically active, educate pregnant women in malnourished populations on how to increase energy and protein intake, and encourage women at risk of micronutrient deficiency to take micronutrient supplements (WHO, 2016). In addition, the recommendations highlight the importance of quality of care for a positive pregnancy experience (41). |
| 30 | ("Food" + "Development and growth") | SCIENCE DIRECT | Domestic violence and breastfeeding practices: a systematic review of observational studies. | https://www.sciencedirect.com/science/article/pii/S2252555361730143X | Raquel de Souza Mezzavilla, Marina de Figueiredo Ferreira, Cintia Chaves Curtioni, Ana Cristina Lindsay, Maria Helena Hasselmann | 2018 | Breast milk is the ideal food for the healthy growth and development of children. The World Health Organization (WHO), the United Nations Children's Fund (Unicef), and the Ministry of Health recommend early initiation of breastfeeding within one hour after birth so that children receive only breast milk for the first six months and that breastfeeding is supplemented with other foods up to two years of age or beyond. (42). |

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Table 1. Selected studies: feeding stimulation is involved in the development of orofacial motor skills in infants (continue from page S494).

| N° | CROSSING | DATABASE | ORIGINAL TITLE | URL | AUTHOR | YEAR | CONTRIBUTION |
|----|-----------------------------------|----------|---|---|---|------|---|
| 31 | "Food" + "Development and growth" | DIALNET | Characterization of cranio-facial alterations in special needs population: autism and mental retardation. A systematic review of the literature | https://dialnet-unirioja-es.unipamplona.basesdadoes-proxy.com/servlet/articulo?codigo=5236039 | Erazo Cerón, Carol Renata; Carrillo Estrada, Gloria Angelar; Velosa Porras, Juliana | 2014 | Harmony in facial morphology and balance between its components are necessary for proper esthetics and function. (43). |
| 32 | "Food" + "Development and growth" | DIALNET | The phonaudiologist in eating disorders: Beyond swallowing | https://arrete.iberro.edu.co/article/view/art.21109 | Gonzalez Moreira, Dalma Judith; Maris Granatto, Stella; Vazquez Fernandez, Patricia | 2021 | In recent years there has been an increase of concern for these reasons in medical consultation, which has promoted the interest of many professionals in the subject, so it is of utmost importance that professional speech therapists are trained in feeding on an integral point of view to accompany children, their families and the whole team involved. (44). |
| 33 | "Food" + "Development and growth" | DIALNET | Breastfeeding and swallowing in newborns | https://journals.co.za/doi/abs/10.4102/sajed.v64i1.209 | Esedra Krüger; Alta Kritzinger; Lidia Pottas Juliana | 2017 | Breastfeeding challenges that may arise from infants with neurologic compromise may include sucking and swallowing difficulties, poor weight gain, separation from the mother in the first week of life, as well as maternal pain, and shock from having an infant with a disorder (45). |
| 34 | "Food" + "Development and growth" | SCIELO | Oral motor control and orofacial function in people with dentofacial deformity | https://www.scielo.br/j/acr/a/8RRBjTnJCITYMz3Ffpb8Q9y/?format=html | Daniela Galvão de Almeida Prado; Silmara Regina Pavani Sovinski; Hugo Nary Filho; Alcione Chedini Brasolotto; Giédre Berreim-Felix | 2015 | Orofacial functions are realized from the interaction of soft and hard tissues, the vascular system, and also the neural control, and in this process function and morphology are intimately linked, since not only the harmonic condition of the structures directly interferes with muscle balance, behavior, since functions also directly interfere with craniofacial growth and development. (1). |
| 35 | "Food" + "Development and growth" | PROQUEST | The Perceptions and Needs of French Parents and Pediatricians Concerning Information on Complementary Feeding | https://www.proquest.com/docview/2554781451/81B1A36CEDDC4E77PQ5 | De Rosso, Sofia; Schwartz, Camille; Ducrot, Pauline; Nicklaus, Sophie. | 2021 | During the first few months of life, an infant faces a phase of rapid growth, which is largely determined by early childhood practices and complementary feeding (CoF). CoF is defined as the period when solid foods begin to be introduced into an infant's diet. Inadequate CoF can have serious implications for a child's healthy growth and the development of healthy eating habits. Adequate infant feeding gives the right footprint to a healthy developmental process for the child, which reduces the risks of chronic noncommunicable diseases in the future. (8). |
| 36 | "Food" + "Development and growth" | SCIELO | Speech development and infant feeding: possible implications | https://www.scielo.br/j/rcefac/a/MBDbdqYWMs9GyFzbtSbbZC/?lang=pt | Victor Costa Alves Medeiros; Vieira, Cláudia Marina; Tavares de Araújo, Sílvia; Regina Jamelli | 2016 | Infant feeding requires special attention from birth since it is the basis for growth, development, and maintenance of the vital state of the human being. In this context, the World Health Organization (WHO) recommends exclusive breastfeeding for the first six months of life. After this age, other foods and liquids are gradually introduced into the child's diet, and this transition should be carefully supervised by a professional assistant. (7). |
| 37 | "Feeding" + "Physiology" | REDALYC | Reasons for breastfeeding abandonment in mothers of children in kindergartens, Manizales, Colombia, 2015: a descriptive study. | https://revistas.umanizales.edu.co/ojs/index.php/archivosmedici-na/article/view/1922/3037 | García Cardona, Aníbal Augusto, Castaño Castrillón, José Jaime; Vallejo Corrales, Santiago; Vargas, Vargas; García Cardona, Aníbal Augusto; Castaño Castrillón, José Jaime; Vallejo Corrales, Santiago. | 2017 | Breastfeeding is a natural process that every woman in normal health can perform. The World Health Organization [WHO] recommends exclusive breastfeeding for the first 6 months of a child's life and continuing with complementary feeding and breastfeeding until the child is at least 1 year old. (11). Breast milk is a food that has all the macronutrients and micronutrients that a newborn needs, and it also has immunological components. (11). |

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FEEDING DEVELOPMENT AND ALTERATIONS IN OROFACIAL MOTOR SKILLS

Table 1. Selected studies: feeding stimulation is involved in the development of orofacial motor skills in infants (continue from page S495).

| Nº | CROSSING | DATABASE | ORIGINAL TITLE | URL | AUTHOR | YEAR | CONTRIBUTION |
|----|--|----------|---|---|--|------|---|
| 38 | ("Orofacial motricity" + "development") | SCIELO | Protocol for surgical planning in cleft lip and palate clinics in the northwestern area of Mexico. | https://scielo.isciii.es/scielo.php?script=sci_arttext&pid=S0376-78922017000400313&lang=es | Alicia Sigler | 2017 | In general, it is established that the treatment of cleft lip and palate should be carried out by a multidisciplinary team. It is not only a matter of correcting the anatomical deformity with surgical procedures but also of promoting adequate language and a favorable psychological development for the integration of the patient in the school environment as well as in society. (46). |
| 39 | ("Orofacial motricity" + "development") | SCIELO | Orofacial myofunctional evaluation in cleft lip and palate: an integrative literature review | https://www.scielo.br/j/cefac/a/ZvBFmp3TzZVLMtsePyDJRL/?lang=en | Andréia Fernandes Graziani/Giétre Beretini-Felix/Katia Flores Genaro | 2019 | The stomatognathic system consists of oral structures and performs several essential functions that are interrelated with its anatomy. Therefore, any influence on this system will result in an adaptation. Cleft lip and cleft palate affect the stomatognathic system and, consequently, the performance of orofacial functions. (4). |
| 40 | ("Orofacial motricity" + "development") | SCIELO | Association between deleterious oral habits and the structures and functions of the stomatognathic system: perceptions of the responsible persons | https://www.scielo.br/j/codas/a/kNy5CMCxeSZLnG6FpRSYd/?lang=pt | Thayse Steffen Pereira Fabiana de Oliveira/Marria Cristina de Almeida Freitas Cardoso | 2017 | Phonation, the articulation of sounds depends on the position and mobility of the tongue, the presence and position of the teeth (occlusion), the mobility of the lips and cheeks, and the position of the mandible, which will promote adequate intraoral space for phonemic articulation and resonance. (47). |
| 41 | ("Physiology" + "development" + "orofacial motricity") | SCIELO | Relation of sensory processing and stomatognathic system of oral respiratory children | https://www.scielo.br/j/codas/a/yRRKqnrSx59CdxFyT0hJCg/?lang=en# | Ana Carollyne Dantas de Lima Raquel Costa Albuquerque Daniiele Andrade da Cunha Camilla Albertina Dantas de Lima Sandro Júnior Henrique Lima Hilton Justino da Silva | 2020 | The stomatognathic system is composed of structures related to vital (breathing, sucking, chewing, and swallowing) and social (phonation and articulation) functions directly intertwined and related to survival. In this sense, changes in any of them can cause a general imbalance in this system, leading to difficulties in daily life and consequently in the quality of life. (3) |
| 42 | ("Physiology" + "development" + "orofacial motricity") | REDALYC | Implementation of orofacial myofunctional therapy in a postgraduate orthodontic clinic. | https://www.redalyc.org/articulo.oa?id=378668256003 | Patricia Arguello Vélez, Noel Antonio Bedoya Rodríguez, Martha Torres Arango, Isabel Sánchez Rodríguez, Claudia Téllez Méndez, Julián Tamayo Cardona, Patricia Arguello Vélez, Noel Antonio Bedoya Rodríguez, Martha Torres Arango, Isabel Sánchez Rodríguez, Claudia Téllez Méndez, Julián Tamayo Cardona | 2018 | It is applied to all users taking into account age as a diagnostic parameter, it is supported by observation, palpation, exercise, praxias, counter-resistance techniques, and subjective tests that account for aspects such as tone, strength, functional competence, anatomical sufficiency, and sensitivity. (48). |
| 43 | ("Physiology" + "development" + "orofacial motricity") | REDALYC | Early treatment of orofacial alterations with physiotherapy and palatal plate in children with Down syndrome. | https://www.redalyc.org/articulo.oa?id=479661310006 | Paula Vivar Vergara, Fernanda Riveros Figueroa, Germán Sepúlveda Hidalgo, María Antonieta Pérez Flores, Claudia Fierro Monti | 2019 | They have multiple genetically determined orofacial disorders, as well as varying degrees of dysfunction of the stomatognathic system. Some of these characteristics are a small skull, midface and nasal facies, bony depression, flat malar processes, and upward-slanting eyes. (49). |
| 44 | ("Physiology" + "development" + "orofacial motricity") | REDALYC | Effect of masticatory muscle training on facial vertical pattern development in children: a narrative review. | https://www.redalyc.org/articulo.oa?id=610064353009 | Catalina Vial, Victor Rojas, Maria Ignacia Zursiedel, Constanza Carmash, Catalina Macherone, Arturo Manns | 2020 | The facial growth pattern is established before the appearance of the first permanent molar. An excess of facial vertical growth corresponds to long-faced individuals with open gonial angles, increased lower facial heights, and masticatory muscles of smaller cross-sectional areas. (50). |

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Table 1. Selected studies: feeding stimulation is involved in the development of orofacial motor skills in infants (continue from page S496).

| N° | CROSSING | DATABASE | ORIGINAL TITLE | URL | AUTHOR | YEAR | CONTRIBUTION |
|----|--|----------------|--|---|--|------|--|
| 45 | ("Physiology" + "development" + "orofacial motricity") | BIOMED | Ethnic inequalities in child stunting and feeding practices: results from surveys in thirteen countries in Latin America. | https://equityhealth.biomedcentral.com/articles/10.1186/s12939-020-01165-9 | Giovanna Gattica-Dominguez, Marilita Amdt Messenburg, Aluisio J. D. Barros and Cesar G. Victora | 2020 | Stunting can lead to irreversible long-term reductions in human capital, including adult height, intelligence, school attainment, and economic productivity, among other things. (51). |
| 46 | ("Physiology" + "development" + "orofacial motricity") | BIOMED | Oral health-related quality of life of children and adolescents affected by rare orofacial diseases: a questionnaire-based cohort study. | https://ojrd.biomedcentral.com/articles/10.1186/s13023-019-1109-2 | Lisa Friedlander, Aiane Berdal, Priscilla Boizeau, Brigitte Alliot Lieht, Marie-Cécile Manière, Arnaud Picard, Olivier Azzis, Marie-Paule Vazquez, Corinne Alberti and Muriel De La Dure Molla | 2019 | According to WHO, oral health affects people physically and psychologically, and not only influences how they grow, enjoy life, look, talk, chew, taste food, and socialize, but also impacts their feelings of social wellbeing (20). |
| 47 | ("Physiology" + "development" + "orofacial motricity") | BIOMED | Breastfeeding and lactation research: exploring a tool to measure infant feeding patterns. | https://internationalbreastfeedingjournal.biomedcentral.com/articles/10.1186/1746-4358-9-5 | Joy Noel-Weiss, Monica Taljaard and Sonya Kujawa-Myles | 2014 | Infant feeding categories, often referred to as breast-feeding definitions, form the basis for describing infant feeding patterns; especially, the duration of breastfeeding and the degree of breastfeeding exclusivity. Researchers use a variety of algorithms and there is no validated tool to measure feeding patterns for research purposes. The objective of this research project was to develop and test a tool for measuring infant feeding patterns for breastfeeding and lactation research (12). |
| 48 | ("Physiology" + "development" + "orofacial motricity") | REDALYC | The influence of ankyloglossia on the growth and development of the stomatognathic system. | https://www.redalyc.org/articulo.oa?id=406051664016 | Livia Eisler Pompeia, Roberta Simoni Ilinski, Crisina Lucia Feijó Ortolanina, Kurt Faltin Júnior | 2017 | During natural lactation, some masticatory muscles begin their maturation and positioning, such as the temporalis (activated in mandibular retraction), the lateral pterygoid (necessary during protrusion), the mylohyoid (mainly responsible for swallowing), and the masseters (activated in sucking mechanics), while the orbicularis oris of the upper and lower lips guide the growth and development of the anterior region of the stomatognathic system, which must function in full neuromotor balance for efficient chewing and swallowing mechanics. According to Van der Laan, the muscular effort involved in suckling is a physical preparation for future function. Chewing (15). |
| 49 | ("Physiology" + "development" + "orofacial motricity") | BIOMED | Effects of breastfeeding duration, bottlefeeding, and non-nutritive sucking habits on the occlusal characteristics of primary dentition. | https://bmcpediatric.biomedcentral.com/articles/10.1186/s12887-015-0364-1 | Xiaoxian Chen, Bin Xia, and Lihong Ge | 2015 | The early transition from breastfeeding and non-nutritive sucking habits may be related to occlusofacial problems. (19). |
| 50 | ("Physiology" + "development" + "orofacial motricity") | BIOMED | The relationship of bottle feeding and other sucking behaviors with speech disorder in Patagonian preschoolers | https://bmcpediatric.biomedcentral.com/articles/10.1186/1471-2431-9-66 | Clarita Barbosa, Sandra Vasquez, Mary A Parada, Juan Carlos Velez Gonzalez, Chanaye Jackson, N David Yanez, Bizu Gelaye and Annette L Fitzpatrick | 2019 | Previous studies have shown that children's non-nutritive sucking habits may result in delayed development of oral anatomy and function. However, these findings were inconsistent. We investigated associations between the use of bottles, pacifiers, and other sucking behaviors with speech disorders in children attending three preschools in Punta Arenas (Patagonia), Chile). (21). |
| 51 | ("Phonology" + "Pediatrics") | DIALNET | Speech therapy in pediatrics | https://dialnet.unirioja.es/servlet/articulo?codigo=6486073 | Mª Macarena Álvarez Hernández | 2018 | The function of the speech therapist is to evaluate, diagnose and intervene in disorders of communication, language (oral and written), speech, and voice, therefore, can work both in the educational and health area. (52). |
| 52 | ("Phonology" + "Pediatrics") | SCIELO | Phonology and human lactation | https://www.scielo.org.co/pdf/rfmu/v65n2/0120-0011-rfmu-65-02-297.pdf | Karen Eliana Ramirez-Gómez Rosa Mercedes Sampallo-Pedroza | 2017 | The American Academy of Pediatrics (AAP) states that exclusive breastfeeding is the ideal and sufficient nutrition to support the growth and development of the baby during the first 6 months and should continue until at least 12 months of age; thereafter, it can be extended for as long as mother and infant desire. (53). |
| 53 | ("Feeding" + "orofacial motricity") | SCIENCE DIRECT | Swallowing problems in children with a tracheostomy | https://www.sciencedirect.com/science/article/pii/S1053585862100041X | Bas Pullens Marloes Streppel | 2021 | Adequate swallowing function is essential for feeding, growing, and thriving. Children with swallowing problems are at risk for malnutrition, behavioral delay, and stressful caregiver interaction (16). |

of life, considering that the family is the primary context for socialization 26). However, this responsibility can generate emotional discomfort in parents and difficulties in the bond with their children, when the feeding situation is not achieved or is tense.

Within infant feeding, it cannot be ignored that there is an important factor related to this process which integrates in a global way the terms mentioned above, it is understood that breastfeeding is the mechanism by which various benefits are achieved that contribute to the development of the human being.

Lactation is one of the main characteristics that identify mammals, to which group human beings belong, and which can mean the difference between life and death of the offspring (34). According to data from the World Health Organization and the United Nations Children's Fund, optimal breastfeeding of infants up to two years of age is more beneficial than any other type of intervention (30).

Thus, exclusive breastfeeding, which includes feeding during the period between 0 and 6 months, is recommended by the World Health Organization (WHO) as a public health policy after this estimated time is when the introduction of complementary feeding should begin, which includes the period in which the child is offered any nutritious food (solid or liquid) in addition to breast milk or infant formula (2). Despite the scarcity of evidence on the best time to initiate it in premature infants, it is recommended that it be done from six months of corrected age, since it is somehow admitted that it provides to some extent the nutrients needed for the current stage of consumption of the same, however, beyond the importance that imminently provides breastfeeding, not providing adequate nutrition from the beginning of life indisputably greatly affects the vital and indispensable functions for the growth of an entire system.

Breast milk is the ideal food for the healthy growth and development of children. WHO, Unicef, and the Ministry of Health (41) recommend early initiation of breastfeeding within one hour after birth so that children receive only breast milk for the first six months and that breastfeeding is supplemented with other foods up to two years of age or older (42).

That is why breastfeeding would be recognized as the ideal food for the healthy growth and development of infants, it is also an important part of the reproductive process with important repercussions on the mother's health.

On the other hand, if the term breastfeeding is defined from a physiological perspective, it is valid to correlate breastfeeding, since this process promotes adequate growth and development of the craniofacial structures since it produces excitation of the orofacial musculature and stimulates a functional and harmonious development of the orofacial system (43). The orofacial musculature is excited and the functional and harmonious development of the orofacial system is stimulated.

It is responsible for maturing the muscles of mastication, as well as stimulating the development of the jaws and differentiating the temporomandibular joints, which helps prevent the development of parafunctional oral habits and malocclusions (46).

In this sense, it is important to emphasize that the child performs the process of swallowing breast milk through breastfeeding, which will allow him/her to reach a feeling of fullness when sucking, and also directly strengthens all the muscles involved in this process. However, it has been evidenced that children who have not been breastfed or have had a short period of breastfeeding and have been bottle-fed will satisfy their sucking instinct through substitutes.

Examples of these are pacifier, digital sucking, tongue sucking, and onychophagia, among other parafunctional oral habits. With the above, it is affirmed that the orofacial muscular development and functioning will be different from that of a child who has accommodated his physiology during the breastfeeding process, bringing with it alterations at the orofacial level, these alterations will be reflected in the process of mobility and functioning of the structures involved in the development of feeding, For example, weakness in the musculature, due to the hypotonia it can cause, weak latch-on and poor nipple suction during breastfeeding, which gives rise to analyze, identify and support that the implementation of different inadequate oral habits allows the appearance and development of alterations in the orofacial system.

There is a close relationship in the conditions evidenced in a solid way on the possible changes

in the orofacial level since it involves an important process that must be done in a conscious and very timely manner from the beginning of the life cycle of the human being. Therefore, it is emphasized that during the first months of life man is in a process of preparation and consolidation of the body in general and especially the orofacial structures for the chewing process to be performed. For this purpose, the diet should include foods that strengthen the feeding, making this an easy process without alteration, that is why you can start with food consistency such as liquid, semi-solid, and finally solid.

Thus, the aforementioned process allows the development and strengthens to a great extent the correct functionality of the muscles and bones that make up the orofacial complex, which implicitly contributes to the development of speech.

Regarding the link of the different amendments anchored to the proper development of orofacial functions, such as speech, chewing, swallowing and phonation, it is valid to establish a firm reason where a punctual perspective on the subject is organized, since it has been shown that significant alterations of facial structures are closely linked to orofacial myofunctional alterations, emphasizing that the presence of craniofacial complexes results from the pathophysiological adjustments at the time of performing the functions executed by this system.

Likewise, and considering the importance of professional experts in the area, it is necessary to argue the management of the speech therapist in the whole feeding process and its relation with the orofacial functions, since speech therapy is the health area in charge of the evaluation, diagnosis, and intervention not only of aspects of speech, language, hearing, voice, swallowing and learning but also of the processes related to the stomatognathic system. All the above to improve or preserve all aspects related to communication, promoting rehabilitation as a fundamental axis, and minimizing situations or circumstances that hinder this purpose.

In context, the different orofacial functions mentioned above, are performed from the interaction of soft and hard tissues, the vascular system, and also the neural control, and in this process function and morphology are intimately

linked, since not only the harmonic condition of the structures interferes directly with the muscle balance, since the functions also interfere directly with the craniofacial growth and development (1).

Thus, the difficulties that may occur in the different orofacial functions are rooted in a mechanical process that should be consolidated in the first days of life, since according to the appearance and the need of the functions where the possible alterations are evidenced, which undoubtedly are related to the development process at a general level (38). If phonation is observed, the articulation of sounds depends on the position and mobility of the tongue, the presence and position of the teeth (occlusion), the mobility of the lips and cheeks, and the position of the jaw, which will promote an intraoral space between the tongue and the mouth (47). The phonemic articulation and resonance will promote an adequate intraoral space for phonemic articulation and resonance and in that order, all the functional and physiological processes of the system form a cycle or a chain where all need each other to consolidate efficiently.

Therefore, multidisciplinary treatments related to the process of education, rehabilitation, and treatment of the alterations that may occur in neonates and infants, as in the case of orofacial alterations, resulting from poor feeding practices, are relevant and beneficial in the development of children. However, it is important not to deviate from the guidelines evaluated in the professional context, respecting the quality and provision of the specific medical services of each sector and the competencies of the specialties involved in the interventions.

CONCLUSIONS

Given the review of the relationship between the feeding process and the functional exercise of the entire orofacial system, it is evident that effectively according to different conceptualization criteria it is important to establish perspectives that support the morphofunctional harmony of the organism, where its wide connection and the need for stimulation from the first months of life are understood, intertwining the part of feeding as a fundamental piece for the growth

and development of the structures of the orofacial system.

Homogeneity is observed in the different articles that contribute to the construction of this review, since it is affirmed that the possible alterations in the orofacial complex may originate from bad habits that gradually affect the anatomy and physiology of the orofacial system, hindering to a great extent the execution of functions that undoubtedly require and involve this system, especially to consolidate the feeding process both in the first months of life and in the harmonious development of the individual.

Since feeding is a process that unquestionably involves the functional exercise of the orofacial system, several risk factors are evidenced in relation to the inadequate functioning of the orofacial structures, bringing with them alterations in the whole system that will cause a general imbalance of this, which leads to difficulties that will have repercussions in the daily life of the infant and consequently in its quality of life.

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