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(RESEARCH ARTICLE)

The importance of orofacial praxis in the development of speech and feeding in children

Dorela Kokthi [1,*], Manika Kreka [2] and Dea Kreka [2]

[1] *Speech Therapist, Department of Diagnostics, Health Rehabilitation and Nursing in Surgery, Nursing, Obstetrics and Gynecology, Faculty of Medical Technical Sciences, University of Medicine, Tirana, Albania.*
[2] *Pediatrician, Department of Pediatrics, Faculty of Medicine, University of Medicine, Tirana, Albania.*

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Abstract

This study looks at how orofacial motor function underpins children's general feeding and communication skills. The coordinated movement of oral structures, including the lips, tongue, jaw and facial muscles, to carry out oral motor skills necessary for sucking, chewing, swallowing and syllable productions is known as orofacial praxis. The authors have focused on the early identification and stimulation of orofacial praxis as a fundamental skill for speech production and development of feeding. A systematic review was conducted to detail the relationships between orofacial motor development and overall neuromuscular coordination. In addition, the research explores how a deficit in oral-facial praxis may lead to communication impairments and difficulties in oral sensory processing which may impact nutritional status and social engagement. In order to improve oral motor control, the study addresses the evaluation of oral-facial abilities utilizing organized tasks and standardized tests, with an emphasis on interdisciplinary teams. In order to promote speech and feeding outcomes, the study also offers evidence in early intervention programs that combine oral-facial therapy, sensory stimulation and parental collaboration. The results emphasize that orofacial praxis should not be considered as an isolated function, it is rather part of a complex developmental system influenced by cognitive, neurological and environmental factors. Thus, early orofacial praxis promotes language development, oral-motor coordination and quality of life. The results of the study indicate that early intervention on orofacial praxis can prevent some future speech and feeding problems.

Keywords: Orofacial praxis; Speech development; Feeding; Oral motor skills; Early intervention

1. Introduction

The ability to speak and eat depends greatly on the functional state and the coordination of the orofacial structures. Speech, chewing, swallowing, and other oral-motor functions, all depend on orofacial praxis, which means moving the lips, tongue, jaw and face muscles with purpose and coordination. These operations are done very fast in the first stages of life when the child learns to communicate and eat through language and feeding abilities. Problems with orofacial praxis may cause speech sound disorders, dysphagia, drooling, and difficulty in chewing and swallowing. Such difficulties may lead a child to have other developmental problems, for example, less social interaction, less intelligible speech, and inadequate nourishment, Kent [1]. Therefore, it is essential to know what orofacial praxis is in clinical and developmental contexts.

Besides just averting the occurrence of speech and feeding problems later on, the process of early evaluation and intervention provides the means for recognizing children's motor coordination skills deficits. Generally, children with different neurodevelopmental disorders, Down syndrome, autism spectrum disorder, and cerebral palsy, may

* Corresponding author: Dorela Kokthi

experience orofacial dysfunctions, which is why the early therapy intervention and the support service team are very important. Moreover, as the child's neurological development matures, the orofacial system also develops, and all aspects of motor control, sensory input, and cognition being co-operative, this results in the effective orofacial movement, Graziani and Capone [2].

This endeavor, primarily through the lenses its diagnostic, preventative, and therapeutic features, delves into the contribution of orofacial praxis to children's speech and eating development. The study, through various motor interventions, targeted techniques, and carefully controlled orofacial stimulation, intends to assess feeding and speech outcomes. Furthermore, it recognizes parental training and regular monitoring as essential components, as the family involvement facilitates the continuation and generalization of the improved speech levels, which, in turn, reflect in orofacial abilities and feeding for the child's holistic growth.

The purpose of this research review is to highlight the important connection between early childhood feeding and communication skills development and orofacial praxis. According to research, speech output and safe feeding depend on the coordination of the oral musculature developed by early sensorimotor experiences like sucking and chewing. Researches published by Bingham and Yeh [3], DeMatteo [4], Lins [5], Mendes and Rocha [6] suggest that kids with poor orofacial function have trouble articulating, have to wait a long time for meals, and have limited eating habits. Additionally, it was discovered that orofacial rehabilitation programs that incorporate aspects of motor imitation and sensory exploration are successful in evaluating eating time, tongue range of motion, and articulation. Consequently, the data indicates that orofacial praxis is an essential domain that links children's motor, language, and eating development.

1.1. Orofacial Praxis and Motor Coordination

An essential component of early infancy speech and feeding skill development is orofacial praxis. The coordination of the oral musculature, which supports the growth of phonation, articulation, and swallowing abilities, is the focus of orofacial praxis. It is supported by research that early sensorimotor activities such as mouthing, sucking and chewing help to establish oral-motor control by strengthening muscle tone and activating the neural circuitry required for precise speech. Children with poor orofacial praxis will often demonstrate difficulties with articulation and delayed verbal expression. Communication skill is one of the areas which can be negatively influenced by orofacial praxis dysfunction that usually requires the intervention to improve oral-motor performance. Hence, the performance of expression, inhalation, and exhalation, as well as continuing to rise the tongue, close the lips, and produce controlled breathing, thereby resulting in speaker's clarity and precision, is considerably enhanced. Furthermore, orofacial praxis affects the temporal relations of breathing, swallowing, and voicing and is an essential component of the growing neuromotor system. Consequently, early assessment of orofacial praxis offers key insights into the child's capacity to develop speech, while also allowing for the early identification of potential speech-motor disruptions. Therefore, mastering motor coordination of oral structures is not only essential for producing speech but also for establishing the neural pathways that underlie linguistic competence [3].

1.2. Relationship Between Orofacial Function and Feeding Development

Feeding behaviors in infancy and early childhood are related to orofacial motor control. The development of the lips, tongue, and jaw provides the necessary and efficient oral capabilities to suck, chew, and swallow for safe and adequate nutrition. Children with decreased or poorly coordinated orofacial movement often exhibit feeding challenges such as prolonged mealtime, food selectivity, gagging, and/or aspiration risk. These challenges pose not only medical issues but can hamper the child’s social and emotional health as the child interacts during the feeding task. Research has shown that if you assess orofacial praxis during pediatric feeding evaluations, you can identify children who may be at risk for dysphagia and mealtime dysfunctions. Additionally, the overlap between the feeding and speech muscles means that interventions designed to promote improved oral motor control have the potential to positively impact both nutrition and communication functions. It has been shown that integrative therapies, which involve muscular development, rhythmic training, and sensory feedback, are effective in encouraging safe chewing and swallowing. Accordingly, incorporating orofacial assessment into feeding evaluations allows for a more thorough understanding of child development and shows how the domains of speech, nutrition, and motor control are all connected under a single therapeutic framework [4].

1.3. Efficacy of Orofacial Therapy Programs

Intervention via organized orofacial therapy has shown positive results in enhancing speech and feeding skills for children with oral-motor delays. These programs generally consist of repetitive exercises designed to utilize imitation, sensory stimulation, and focused movement of the lips, cheeks, and tongue (6). The aim is to improve coordination,

strength, and precision in the oral musculature in order to facilitate articulation, and increase feeding efficiency. Research indicates that children who benefit from early orofacial therapy show improvements in their speech intelligibility, tongue mobility, and control of oral movements. Therapists have also noted a reduction in feeding challenges, including drooling and poor chewing patterns. However, orofacial therapy also offers benefits outside of the mechanical realm by providing children with increased self-confidence and communication effectiveness, thereby promoting social participation. Family engagement paired with inter-professional collaboration between speech language pathologists and occupational therapists consistently shows better longevity of outcomes. The therapeutic value of a programming framework that consists of routine, structured, and guided orofacial motor exercises with increased practice outside of the therapy environment has been established with preschool children showing significant improvement in articulation and feeding behaviors [5].

2. Material and methods

The article is based on secondary data, a qualitative literature review design. In this sense, the method's goal was to critically synthesize and assess empirical and theoretical studies published within the last 9–10 years (2015–2024) (122), which may be understood as an etic appraisal, rather than facilitating some sort of therapeutic intervention. The literature search attempted to access articles in peer-reviewed journals published in the U.S. and internationally. Search engines included academic sites such as PubMed, ScienceDirect, Google Scholar and SpringerLink. Several different keywords were selected for the search process; these keywords include "orofacial praxis," "oral-motor development," "speech sound disorders," "feeding difficulties," "oral-motor therapy," and "speech-language pathology." Studies that (a) involved children aged 0–8 years, (b) addressed orofacial motor functions associated with speech and/or feeding, and (c) were written in English and subjected to peer review were included. Studies that looked at adults, neurological conditions that aren't predominantly linked to orofacial dysfunctions, and studies without any empirical support were excluded. Identification, screening, and topic analysis are the review processes. Each study was analyzed by the authors using thematic synthesis. The study data extracted indicated the types of interventions, assessment tools utilized (e.g., Orofacial Praxis Test, OMAS) and outcomes of speech clarity and feeding performance. The synthesis focused on establishing an overall understanding of how early orofacial training supports motor coordination, articulation and feeding performance

Table 1 Methodological Framework

Aspect	Description
Research Design	Qualitative literature review
Purpose	To analyze and synthesize research on the relationship between orofacial praxis, speech, and feeding development in children
Data Sources	PubMed, ScienceDirect, Google Scholar, SpringerLink
Keywords	Orofacial praxis, oral motor development, feeding, speech disorders, oral-motor therapy
Inclusion Criteria	Studies on children aged 0–8 years; peer-reviewed; focus on speech or feeding related to orofacial function
Exclusion Criteria	Adult populations, unrelated neurological disorders, non-empirical articles
Analysis Method	Thematic synthesis and qualitative interpretation
Outcome Focus	Relationships between orofacial training, speech articulation, and feeding coordination
Timeframe of Sources	2015–2024

3. Results and discussion

The results of this analysis of the literature combine data from 26 peer-reviewed research that looked into the connection between children's feeding abilities, speech development, and orofacial praxis. Overall, the reviewed research points to a correlation between increased orofacial motor coordination and safer swallowing, more effective chewing, and better speech intelligibility. Systematic orofacial training programs improve oral-motor strength and accuracy, which improves phonation clarity and promotes a deeper acceptance of solid foods, according to the majority of research, [5].

Children through special orofacial exercises have made significant changes in their language and feeding skills even if the methods in the literature reviewed have been varied from experimental designs to observational research in clinical settings. These findings are in line with Kent [1] who emphasized that orofacial coordination is the base of speech phonological accuracy and respiratory control. In addition, changes in mandibular stability, labial closure, and tongue dorsum elevation were specifically to become more efficient in chewing and more fluent in speaking, which is a way of showing the interrelation of language output and motor control.

Table 2 Key Findings from Reviewed Studies on Orofacial Praxis

Study	Focus Area	Sample	Main Outcomes	Reported Improvement
Bingham & Yeh (2019)	Orofacial coordination and phonological processing	60 preschool children	Strengthened oral musculature improved articulation	+48% articulation accuracy
DeMatteo (2020)	Feeding control and oral-motor stability	45 children aged 3–6	Shorter mealtime duration and better food tolerance	+50% feeding efficiency
Lins (2022)	Effectiveness of orofacial therapy	72 participants	Enhanced tongue elevation and lip strength	+52% oral-motor control
Mendes & Rocha (2021)	Neural basis of orofacial movements	Review of 30 studies	Identified neural circuits linking motor and speech processes	Theoretical advancement

While the degree of improvements varied based on study reports, there is consistent evidence for the hypothesis that oral-motor practice strengthens neuromotor patterns critical for articulation and food intake.

Table 3 Thematic Synthesis of Observations from Reviewed Literature

Functional Domain	Initial Observations (Pre-Intervention, Baseline)	Outcomes After Intervention (Reported in Studies)	Key Interpretation
Lip Closure	Weak or inconsistent	Improved and sustained closure	Increased air pressure control supports clearer phonation
Tongue Elevation	Limited range	Greater precision and elevation	Facilitates articulation of alveolar and palatal sounds
Jaw Stability	Unsteady movement	Balanced and rhythmic chewing	Enhances coordination for both speech and feeding
Swallowing	Incomplete or uncoordinated	More synchronized and safe	Reduces drooling and choking risk

These combined results demonstrate that orofacial praxis influences the neuronal and motor coordination needed for speech and feeding. In agreement with Bingham et al. [3] neuromotor strengthening in oral structures facilitates not only accurate production of phonemes, but respiratory control and sequential swallows as well.

Table 4 Comparative Analysis of Feeding and Speech Outcomes Reported in the Literature

Observation Area	Before Orofacial Training (Across Studies)	After Orofacial Training (Across Studies)	Reported Source or Feedback
Feeding Duration	Long (average 40–50 min)	Reduced to 20–30 min	Parental and clinical reports
Speech Clarity	Low to moderate	High articulation accuracy	Speech-language assessments

The combination of both the clinical and parent perspectives presented in the literature review above contributed to the support of early orofacial interventions. Parents reported shorter mealtime periods and acceptance of some food textures, while clinicians noted better control of speech sound production.

4. Conclusion

These results demonstrate that orofacial praxis, which includes motor, sensory, and linguistic processes, is essential to children's speech and eating development. The study confirms that well-structured orofacial therapies can facilitate phonological accuracy and feeding competencies in early childhood. The literature also indicates the importance of early identification and specific formative therapy. Authors agree that early interventions once children begin preschool could impact cough, swallow, and long term phonological and feeding challenges. There is a relationship between parental foundational involvement of therapeutic skills and children maintaining therapy progress.

In summary, orofacial praxis is a dimensional constellation shaped by neuromotor, cognitive and behavioral systems. Based on the integrated evidence, recommendations support: (1) early orofacial screening in pediatrics; (2) intervention programs using specific goals and ongoing assessment of individual determinants for children; and (3) parent/caregiver education focused on oral-motor development specifically for nutrition and communication. Longer term studies should also aim to convey methodological bases that are evidence-based and standardized, which may improve experience in practice and as a result the preventable impact of a child's quality of life through feeding/speaking outcomes.

Compliance with ethical standards

Disclosure of conflict of interest

The author has no conflicts of interest in the study's design, review, or publication. The analysis was performed independently and free of any influences of funding agency, research institution, or commercial company. All sources of literature were selected on the basis of research quality, rigor and appropriateness to the aims of the research. There are no potential financial or professional affiliations that might call into question the independence of interpretations or conclusions. This independence ensured the objectivity, transparency, and integrity of the research.

Statement of ethical approval

Given that this research involved secondary data relying on previously published sources, there was no direct involvement of human participants. Therefore, formal ethical approval for human subjects was not required and the study adhered to ethical principles of academic integrity, which include appropriately attributing and citing others' work, being transparent regarding intellectual property, and avoiding plagiarism. The studies included in the review all took place based on some form of institutional ethical approval or assistance, as expressed in their respective studies or publications. In the synthesis, use of the data was done responsibly and ethically and was meant to make a positive contribution to the area of speech-language pathology and pediatric motor development research.

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