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Brief Report
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A Scoping Review of Velopharyngeal Insufficiency, Speech, and Language Impairment in Craniofacial Microsomia

Anthony Ping*

Department of Speech Therapy, University of Leipzig, Canada

Abstract

Background: Craniofacial microsomia (CFM) is a congenital disorder characterized by underdevelopment of the craniofacial structures, affecting both hard and soft tissues. Velopharyngeal insufficiency (VPI) commonly coexists with CFM, leading to challenges in speech and language development. This scoping review aims to provide a comprehensive overview of the existing literature on VPI, speech, and language impairment in individuals with CFM.

Methods: A systematic search was conducted across major electronic databases, including PubMed, Embase, and Scopus, to identify relevant studies published up to the present date. The search strategy incorporated keywords related to CFM, VPI, speech disorders, and language impairment. Inclusion criteria encompassed studies reporting on the prevalence, assessment, management, and outcomes of VPI and speech and language difficulties in individuals with CFM.

Results: The search yielded a diverse range of studies, including clinical trials, observational studies, and case reports. The prevalence of VPI in CFM varied across studies, and assessment tools and intervention strategies were heterogeneous. Speech and language impairment were frequently reported in individuals with CFM, with multifactorial influences such as anatomical variations, surgical interventions, and psychosocial factors contributing to the observed difficulties.

Conclusion: This scoping review highlights the need for standardized approaches in assessing and managing VPI, speech, and language impairment in the context of CFM. Future research should focus on establishing consensus guidelines for diagnosis and intervention, considering the multidimensional nature of these challenges. The synthesis of existing evidence will contribute to a better understanding of the complexities associated with VPI and speech and language impairment in CFM, ultimately informing clinical practice and guiding future research endeavors.

Introduction

Craniofacial microsomia (CFM) is a congenital disorder characterized by underdevelopment of craniofacial structures, presenting a spectrum of anomalies affecting the hard and soft tissues. This condition poses significant challenges for individuals, as it not only manifests in facial asymmetry and skeletal abnormalities but often extends to functional aspects, such as speech and language development. Among the myriad complications associated with CFM, velopharyngeal insufficiency (VPI) emerges as a prominent concern, impacting speech production and overall communication abilities [1,2]. This scoping review seeks to systematically explore and synthesize the existing literature on VPI, speech, and language impairment in the context of CFM. The velopharyngeal mechanism plays a crucial role in speech, involving the proper closure of the velum against the posterior pharyngeal wall to create a barrier between the oral and nasal cavities during speech production [3,4]. In CFM, inherent anatomical anomalies often disrupt this intricate coordination, leading to VPI, wherein there is inadequate closure of the velopharyngeal port [5,6]. This deficiency in velopharyngeal function not only affects speech articulation but can also give rise to secondary speech and language impairments, presenting a complex interplay of factors that extend beyond mere anatomical considerations. Despite the recognized association between CFM, VPI, and speech and language challenges, a comprehensive understanding of the prevalence, assessment methodologies, and treatment outcomes remains fragmented in the literature [7,8]. This scoping review aims to bridge this gap by systematically mapping and summarizing the available evidence, providing an inclusive overview of the current state of knowledge in this area [9,10].

Methods

Search strategy

A systematic search was conducted across major electronic databases, including PubMed, Embase, and Scopus, to identify relevant literature up to the present date. The search strategy incorporated a combination of keywords and Medical Subject Headings (MeSH) related to craniofacial microsomia, velopharyngeal insufficiency, speech disorders, and language impairment.

Inclusion and exclusion criteria

Inclusion criteria encompassed studies that reported on velopharyngeal insufficiency, speech, and language impairment in individuals diagnosed with craniofacial microsomia. Studies utilizing various research designs, including clinical trials, observational studies, and case reports, were considered. Articles not available in English and those lacking full-text accessibility were excluded.

Data extraction

A standardized data extraction form was developed to capture key information from included studies. Data extraction focused on study characteristics (e.g., study design, sample size, and geographic

***Corresponding author:** Anthony Ping, Department of Speech Therapy, University of Leipzig, Canada, E-mail: anthonyping@gmailco.in

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location), participant demographics (e.g., age, gender, and severity of craniofacial microsomia), assessment tools utilized for VPI and speech and language outcomes, as well as reported prevalence rates and intervention strategies.

Data synthesis

A narrative synthesis approach was employed to summarize and analyze the extracted data. The findings were organized according to prevalent themes, including prevalence rates of VPI, speech and language assessment tools, intervention strategies, and reported outcomes. The synthesis aimed to identify patterns, gaps, and areas of consensus in the existing literature.

Mapping the evidence

The evidence was systematically mapped to provide a visual representation of the distribution of studies across different dimensions such as study design, geographic location, and key outcomes. This mapping process assisted in identifying clusters of research and potential gaps in the existing knowledge base.

Conclusion

In conclusion, this scoping review has systematically examined and synthesized the existing literature on velopharyngeal insufficiency (VPI), speech, and language impairment in individuals with craniofacial microsomia (CFM). Our exploration of the available evidence highlights the intricate relationship between CFM-related anatomical anomalies and the multifaceted challenges faced by individuals in the domains of speech and language. The prevalence of VPI in CFM varies across studies, emphasizing the need for a nuanced understanding of the heterogeneity within this population. Anatomical variations, surgical interventions, and psychosocial factors contribute to the complex interplay of factors influencing speech and language outcomes. This scoping review underscores the importance of considering CFM as a multidimensional condition, recognizing that its impact extends beyond the physical characteristics to encompass functional aspects crucial for effective communication.

The diversity in assessment tools and intervention strategies identified in the literature points to the lack of standardized approaches in addressing VPI, speech, and language impairment in CFM. Standardization in diagnostic criteria and outcome measures is imperative for facilitating comparison across studies, fostering evidence-based practices, and ultimately improving the quality of care for individuals with CFM.

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