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A COMPREHENSIVE AND RELIABLE CLASSIFICATION SYSTEM FOR PRIMARY DIAGNOSIS OF CONGENITAL CLEFT LIP AND PALATE

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Abstract

Congenital cleft lip and palate (CLP) are among the most common craniofacial anomalies and require early and accurate diagnosis for effective treatment planning. Primary diagnosis plays a crucial role in determining the timing, sequence, and type of surgical and multidisciplinary interventions. However, the lack of a universally accepted, comprehensive, and reliable classification system often complicates early diagnosis and interdisciplinary communication. This article reviews existing classification systems for cleft lip and palate and proposes the essential characteristics of a complete and reliable classification framework suitable for primary diagnosis. Emphasis is placed on anatomical accuracy, clinical applicability, and diagnostic consistency to improve patient outcomes and treatment coordination.

Key Words

Congenital cleft lip and palate; primary diagnosis; classification system; craniofacial anomalies; pediatric dentistry; multidisciplinary care

Introduction

Congenital cleft lip and palate represent complex developmental anomalies resulting from incomplete fusion of facial structures during embryogenesis. These conditions affect feeding, speech, dentofacial development, and psychosocial well-being. Early and accurate primary diagnosis is essential for initiating timely surgical intervention and planning long-term multidisciplinary care.

A standardized classification system is a critical component of primary diagnosis, as it allows clinicians to describe the type, extent, and anatomical involvement of the cleft accurately. Despite the availability of multiple classification systems, variations in terminology and diagnostic criteria continue to pose challenges in clinical practice. Therefore, there is a need for a comprehensive and reliable classification system that can be effectively used during the initial diagnostic stage.

This article aims to analyze existing cleft classification systems and to define the key principles of an optimal classification framework for primary diagnosis of congenital cleft lip and palate.

Several classification systems for cleft lip and palate have been proposed and utilized in clinical practice. One of the earliest and most widely known systems is the Veau classification,

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which categorizes clefts based on anatomical involvement of the lip, alveolus, and palate. While simple and easy to use, this system lacks sufficient detail for complex cases.

The Kernahan "striped Y" classification provides a more detailed anatomical representation and allows precise documentation of cleft components. However, it requires specialized training and may be less practical for rapid primary diagnosis.

The LAHSAL classification system offers a symbolic representation of cleft anatomy and is useful for record-keeping and research. Despite its precision, its complexity can limit routine clinical use during early diagnosis, particularly in resource-limited settings.

These limitations highlight the need for a classification system that balances simplicity, completeness, and clinical reliability.

An effective classification system for primary diagnosis of congenital cleft lip and palate should meet several essential criteria. First, it must be anatomically comprehensive, clearly distinguishing between cleft lip, alveolar cleft, hard palate cleft, and soft palate cleft. Second, the system should indicate laterality (unilateral or bilateral) and severity to guide surgical planning.

Third, the classification must be easy to apply during the neonatal period and understandable by all members of the multidisciplinary team. Fourth, it should support standardized documentation and facilitate communication between pediatric dentists, surgeons, orthodontists, and speech therapists.

Finally, reliability and reproducibility are crucial to ensure consistent diagnosis across different clinicians and healthcare settings.

In primary diagnostic practice, a comprehensive classification system enables early identification of feeding difficulties, airway risks, and associated anomalies. Accurate classification supports appropriate referral, parental counseling, and treatment sequencing.

The use of a standardized classification system during initial assessment improves diagnostic confidence and reduces variability in clinical decision-making. It also enhances data collection for epidemiological studies and outcome evaluation.

Results

The analysis of existing classification systems for congenital cleft lip and palate demonstrates significant variability in terms of anatomical detail, clinical usability, and reliability during primary diagnosis. Traditional classification systems, such as the Veau classification, were found to be simple and easy to apply in neonatal settings; however, they lack sufficient detail to accurately describe complex cleft patterns involving the lip, alveolus, and palate simultaneously.

More detailed systems, including the Kernahan "striped Y" and LAHSAL classifications, provide comprehensive anatomical representation and allow precise documentation of cleft components. These systems improve diagnostic accuracy and are particularly useful for surgical planning and research purposes. Nevertheless, their complexity and symbolic notation were identified as limitations for rapid application during initial clinical assessment, especially in primary healthcare settings.

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The reviewed literature indicates that classification systems combining clarity, completeness, and ease of use result in higher diagnostic consistency among clinicians. Systems that clearly differentiate cleft type, laterality, and extent were associated with improved interdisciplinary communication and more structured treatment planning. In particular, standardized classification at the time of primary diagnosis facilitated early identification of feeding difficulties, airway risks, and the need for urgent referral to specialized cleft care teams.

Additionally, studies reported that reliable and reproducible classification systems reduced diagnostic variability and improved documentation quality in medical records. This consistency was shown to be beneficial for long-term follow-up, outcome assessment, and epidemiological data collection.

Overall, the results suggest that while existing classification systems provide valuable frameworks, an integrated classification approach that balances anatomical precision with clinical practicality offers the most effective solution for primary diagnosis of congenital cleft lip and palate.

Discussion

The findings of this review emphasize that no single existing classification system fully satisfies the requirements of primary diagnosis in congenital cleft lip and palate. While traditional systems provide valuable anatomical descriptions, their limitations in terms of usability and diagnostic reliability highlight the need for an integrated approach.

A comprehensive and reliable classification framework should combine anatomical precision with clinical practicality. Such a system would improve early diagnosis, enhance interdisciplinary collaboration, and contribute to better functional and aesthetic outcomes. Future research should focus on validating integrated classification models and assessing their impact on clinical decision-making and long-term outcomes.

Conclusion

A complete and reliable classification system is essential for the primary diagnosis of congenital cleft lip and palate. Accurate and standardized classification facilitates early intervention, improves interdisciplinary communication, and supports effective treatment planning. While existing systems provide important foundations, there remains a need for an optimized classification framework that is both comprehensive and practical for routine clinical use. Adoption of such a system will contribute significantly to improving the quality of care and outcomes for patients with congenital cleft lip and palate.

A comprehensive and reliable classification system plays a critical role in the primary diagnosis of congenital cleft lip and palate, serving as the foundation for effective clinical decision-making and multidisciplinary treatment planning. Accurate classification at the initial diagnostic stage allows clinicians to clearly identify the type, extent, and anatomical components of the cleft, thereby facilitating timely intervention and appropriate referral to specialized care teams.

The findings of this review highlight that while traditional classification systems have contributed significantly to the understanding and documentation of cleft anomalies, none fully meet the combined requirements of anatomical completeness, clinical practicality, and diagnostic reliability during primary assessment. Simplified systems offer ease of use but lack sufficient

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detail, whereas more comprehensive systems provide precision at the cost of complexity and limited accessibility in routine clinical settings.

An optimized classification framework that integrates anatomical accuracy with user-friendly application is essential for improving diagnostic consistency and reducing variability among clinicians. Such a system enhances interdisciplinary communication, supports standardized medical documentation, and enables effective long-term follow-up and outcome evaluation. Moreover, reliable classification at the primary diagnostic stage contributes to better parental counseling, early management of feeding and airway issues, and improved coordination of surgical and rehabilitative care.

In conclusion, the adoption of a complete, standardized, and clinically applicable classification system for congenital cleft lip and palate is fundamental to improving the quality of primary diagnosis and patient care. Future research should focus on validating integrated classification models and assessing their impact on clinical outcomes, with the ultimate goal of optimizing early diagnosis and enhancing the overall management of patients with cleft lip and palate.

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