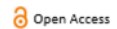




Original Article



Parental Perception of Speech Intelligibility Among Children with Repaired Cleft Lip and/or Palate: A Cross-Sectional Study

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Abstract

Background: Cleft lip and palate (CLP) are common congenital anomalies that significantly impact speech development. While surgical repair is foundational, optimal speech intelligibility often requires sustained therapeutic intervention. Parental perceptions are crucial for understanding functional communication outcomes and shaping family-centered care. **Objective:** To find out the parental perspectives on the speech intelligibility of their children (aged 3-6 years) with repaired cleft palate. **Methods:** A cross-sectional study was conducted with 100 parents/caregivers of children with cleft lip and/or palate (CLP). Participants were recruited via convenience sampling from three cleft care hospitals in Lahore. Data were collected using a structured Speech Questionnaire Parent Form, capturing demographics, surgical/therapy history, and parental ratings of intelligibility across eight communicative contexts. Analysis was performed using SPSS version 26, employing descriptive statistics. **Results:** Parental understanding was higher for single words (88% reported "always" understanding) than for conversational speech (44% "always"). Intelligibility was rated lower by unfamiliar listeners, especially in challenging contexts: over the phone (majority "rarely/sometimes"), with unfamiliar topics (78% "never/rarely/sometimes"), and in noisy environments. Access to speech-language therapy was limited; only 52% of children had received therapy, with merely 17.3% attending weekly sessions. Children with bilateral or complete clefts were perceived to have poorer intelligibility compared to those with unilateral or incomplete clefts. **Conclusion:** Surgical repair alone is insufficient for optimal speech outcomes. Parental perspectives highlight significant gaps in the intensity and accessibility of essential speech-language therapy. The findings advocate for a comprehensive, family-centered care model that integrates early and intensive therapy, parental education, and psychosocial support to address both functional communication and the child's socio-emotional well-being.

Introduction

The congenital orofacial defect which results from incomplete fusion of facial tissues during embryonic development is cleft lip and/or palate (CLP). These defects can be categorized based on the involvement of the anatomical structures and the side of the defect, and they vary from a simple notch in the lip to a complete cleft of the lip, alveolus, and palate. The incidence of this defect is one in seven hundred live births, with a higher prevalence in the Asian population [1]. Speech intelligibility is a measure of how well listeners are able to comprehend the spoken messages produced by a child, and is seen as one of the most crucial measures among the functional outcomes of children with cleft lip and/or palate (CLP), as it is a reflection of a child's ability to communicate in their daily life [2].

The condition requires lifelong and multidisciplinary management for the treatment of the structural, functional, and psychological aspects of cleft lip and/or palate (CLP). Cleft lip and palate have multifactorial genetic and environmental etiologies that occurs as a result of the improper development of the face during the first trimester of pregnancy [3]. Despite the technical challenges, there has been progress in the prenatal diagnosis of cleft lip and/or palate (CLP), especially with three-dimensional ultrasound and fetal magnetic resonance imaging [4].

Cleft lip and palate can be isolated or associated defects, such as submucous cleft palate. These are usually associated with a range of genetic syndromes, most commonly 22q11.2 deletion syndrome, which results in multisystem disease beyond the orofacial complex [5]. Surgical management involves

established techniques according to recent data on timing, with current recommendations from the American Cleft Palate-Craniofacial Association advising lip repair by twelve months and palatoplasty by eighteen months [6].

Well-coordinated surgical and therapy management is required in children with cleft lip and/or palate (CLP), to ensure optimal outcomes in speech because simply early palatoplasty alone is not sufficient to ensure normal speech development. The critical need for early and continued speech-language pathology management is underscored by the significant percentage of children who, despite surgical correction, have persistent speech abnormalities that significantly affect speech intelligibility and function [7].

Although the primary objective of palate surgery is the attainment of velopharyngeal competence, velopharyngeal dysfunction persists in most cases, resulting in compensatory articulation, hypernasality, nasal air emission, and reduced speech intelligibility [8].

Children with cleft lip and/or palate (CLP) are at increased risk of delayed speech development and reduced speech intelligibility because of the disrupted integration of structural integrity with cognitive-linguistic processing. Empirical evidence indicates that the outcome of speech intelligibility following palatoplasty is highly variable and often suboptimal. Therefore, speech intelligibility is still a major predictor of functional surgical success in patients with cleft lip and palate [9].

Children with cleft lip and palate are predisposed to speech characteristics such as, such as hypernasality, nasal air emission, and articulation disorders, which in combination reduce the intelligibility of speech. Speech-language therapy is often required for the compensatory articulation patterns, and the most effective outcomes can be achieved by a comprehensive, family-based management approach that considers both the communication impairments and the information and psychosocial needs of the parents [10].

While there is still some variation in the actual integration of parents into therapy, the evidence for the treatment of non-cleft speech sound disorders supports the use of parent-mediated interventions, emphasizing their importance in the management of cleft palate. The importance of strong alliances, good therapeutic direction, and well-organized parent training to successful collaboration is emphasized. This demonstrate the significance of better professional preparation and more specific practice guidelines to assist speech-language pathologists in successful home-based interventions [11]. Whereas considerable research has been conducted on the structure, surgery, and treatment of, not much has been done on understanding the parental perception of the intelligibility of speech in their children, especially in developing countries where there is limited access to special care for cleft lip and/or palate (CLP) along with speech therapy. Parents play an important role in the life of their child's daily communication and thus are in the best position to provide their opinion on functional communication outside the clinical setting. In

Pakistan, where the pathway to referrals, therapy, and follow-ups for cleft lip and/or palate (CLP) cases can greatly vary, a parental assessment on the speech intelligibility of their children might serve to better understand the reality of the gap in service provision. Nevertheless, limited research has been conducted on the parental perceptions of speech intelligibility among various types of clefts and communicative situations in this community. The objective of the study was thus to explore parental perception of the speech intelligibility of children aged 3 to 6 years with repaired cleft lip and/or palate (CLP). This study has several limitations. First, convenience sampling from three centers in Lahore may limit the generalizability of the findings. Second, speech intelligibility was assessed solely through parental perceptions rather than direct clinical evaluation by speech-language pathologists. Third, the cross-sectional design does not allow for causal inferences regarding therapy outcomes. Lastly, certain subgroup sizes (e.g., submucous cleft) were small, which warrants cautious interpretation of statistical comparisons.

Methodology

This study was a cross-sectional design to collect data over a six-month period. Participants were recruited using a convenience sampling method from the outpatient departments of three specialized care centers in Lahore: CLAPP Hospital, Rex Medical Center, and Arif Memorial Hospital. The final sample consisted of total of 100 parents or primary caregivers participated of children with cleft lip and/or palate (CLP). Inclusion criteria were, the child to be between 3 and 6 years of age, diagnosed with any type of repaired cleft palate, and free from other significant comorbid conditions. Data collection was performed using a structured tool comprising two sections: a demographic and clinical history form and the standardized Speech Questionnaire Parent Form, which assesses parental perception of speech intelligibility across various contexts. Questionnaires were administered in person. Data analysis was conducted using SPSS Statistics software (version 26). Descriptive statistics, including frequencies and percentages, were computed to summarize participant characteristics and responses, which were then presented in tables and figures.

Ethical Considerations

Ethical approval for this study was obtained from the Institutional Review Board / Ethical Review Committee of Riphah International University [Ref No: REC/RCR&AHS/25/3015]. Administrative permissions were granted by CLAPP Hospital, Rex Medical Center, and Arif Memorial Hospital, Lahore, prior to data collection. Written informed consent was obtained from all parents/primary caregivers of participating children. Participation was voluntary, and the confidentiality and anonymity of all participants were strictly maintained.

Results

The research was to explore the parental perspective regarding speech intelligibility of children with cleft lip and/or palate (CLP). A total of 100 parents or caregivers participated in this

study. Data were collected through Speech Questionnaire Parent Form from CLAPP Hospital, Rex Medical Center, Arif Memorial Hospital. Data were analyzed using SPSS Statistics, version 26. Results of all the tables are mentioned below.

Table 1. Descriptive Statistics of Demographic variables

	Categories	Frequency	Percentage (%)
Age Years	3-3.5	27	27.0
	3.6-4.5	21	21.0
	4.6-5.5	9	9.0
	5.6-6	43	43.0
Gender	Male	55	55.0
	Female	45	45.0
Birth Order	Only Child	2	2.0
	First Born	27	27.0
	Middle	32	32.0
	Youngest	39	39.0
Number of Siblings	1-3	64	64
	4-6	36	36
Family Type	Nuclear	35	35.0
	Joint	65	65.0
Age at Cleft Palate	3-6 months	60	60.0
	7-12 months	28	28.0
	19-24 months	3	3.0
	2-3 years	8	8.0
	After 3 years	1	1.0
Number of Surgeries	1-3	76	76.0
	4-7	24	24.0
Speech Therapy Done Before	Yes	52	52.0
	No	48	48.0
Age at First Therapy Session	3-4 years	43	43.0
	5-6 years	9	9.0
Duration of Therapy Session	<6 months	15	15.0
	6-12 months	14	14.0
	>12 months	23	23.0
Frequency of therapy sessions	Weekly	9	9.0
	Biweekly	2	2.0
	Monthly	41	41.0
Number of Speech Therapy Sessions	<5	11	11.0
	6-12	13	13.0
	>12	28	28.0
Cleft Type	Unilateral Cleft Lip or Palate	37	37.0
	Bilateral Cleft Lip or Palate	24	24.0
	Cleft Palate Only	20	20.0

	Cleft Lip only	5	5.0
	Submucous Cleft Palate	2	2.0
	Complete Cleft palate	3	3.0
	Incomplete Cleft Palate	9	9.0

Table 2. Crosstab analysis of Parental Perceptions of Speech Intelligibility Among Children with Repaired Cleft Lip and/or Palate: A Cross-Sectional Study

1: "Do you understand your child's conversational speech?"	Categories	Never	Rarely	Sometimes	Often	Always
	Unilateral Cleft Lip or Palate		0	4	17	16
	Bilateral Cleft Lip or Palate		1	3	10	10
	Cleft Palate Only		0	4	12	4
	Cleft Lip only		0	0	0	5
	Submucous Cleft Palate		0	0	2	0
	Complete Cleft palate		0	1	1	1
	Incomplete Cleft Palate		0	0	1	8
2: Do You Understand Your Child's Production of single word?	Unilateral Cleft Lip or Palate		0	1	1	35
	Bilateral Cleft Lip or Palate		1	0	3	20
	Cleft Palate Only		0	0	4	16
	Cleft Lip only		0	0	0	5
	Submucous Cleft Palate		0	0	1	1
	Complete Cleft palate		0	0	1	2
	Incomplete Cleft Palate		0	0	0	9
3: Do others understand your child's speech when talking face-to-face?	Unilateral Cleft Lip or Palate		5	19	12	1
	Bilateral Cleft Lip or Palate		6	7	10	1
	Cleft Palate Only		5	13	2	0
	Cleft Lip only		0	0	2	3
	Submucous Cleft Palate		1	1	0	0
	Complete Cleft palate		1	2	0	0
	Incomplete Cleft Palate		0	7	1	1
4: Do others Understand When Your Child Talks on Telephone?	Unilateral Cleft Lip or Palate	8	12	10	5	0
	Bilateral Cleft Lip or Palate	3	8	8	1	1
	Cleft Palate Only	5	11	2	1	0
	Cleft Lip only	0	0	2	1	2
	Submucous Cleft Palate	1	1	0	0	0
	Complete Cleft palate	1	2	0	0	0
	Incomplete Cleft Palate	1	4	1	0	1
5: Do others understand when your child talks on topic familiar to the listener?	Unilateral Cleft Lip or Palate		4	18	13	2
	Bilateral Cleft Lip or Palate		6	8	9	1
	Cleft Palate Only		4	14	2	0
	Cleft Lip only		0	1	1	3
	Submucous Cleft Palate		1	1	0	0
	Complete Cleft palate		1	2	0	0
	Incomplete Cleft Palate		0	7	1	1

6: Do others understand when your child talks on a topic unfamiliar to the listener?	Cleft Type Unilateral Cleft Lip or Palate	8	19	9	1	0
	Bilateral Cleft Lip or Palate	7	10	6	0	1
	Cleft Palate Only	13	7	0	0	0
	Cleft Lip only	0	2	0	3	0
	Submucous Cleft Palate	1	1	0	0	0
	Complete Cleft palate	3	0	0	0	0
	Incomplete Cleft Palate	4	3	1	0	1
7. Do others understand when your child talks in quiet environment?	Unilateral Cleft Lip or Palate		6	16	13	2
	Cleft Palate Only		6	9	8	1
	Cleft Lip only		6	12	2	0
	Submucous Cleft Palate		0	1	1	3
	Complete Cleft palate		1	1	0	0
	Incomplete Cleft Palate		1	2	0	0
	Bilateral Cleft Lip or Palate		0	7	1	1
8: Do others understand when your child talks in noisy environment?	Unilateral Cleft Lip or Palate	18	13	2	3	0
	Bilateral Cleft Lip or Palate	10	9	4	0	1
	Cleft Palate Only	13	7	0	0	0
	Cleft Lip only	0	2	0	2	1
	Submucous Cleft Palate	2	0	0	0	0
	Complete Cleft palate	3	0	0	0	0
	Incomplete Cleft Palate	7	0	1	1	0
9: Is your child aware of his/ her Speech Differences?	Cleft Type Unilateral Cleft Lip or palate	Yes	37			
	Bilateral Cleft Lip or palate		24			
	Cleft Palate Only		20			
	Submucous Cleft Palate	No	2			
	Complete Cleft Palate		3			
	Incomplete Cleft Palate		9			

Table 3. Independent-Samples t-Test Comparing Total Intelligibility Score by Timing of Cleft Repair (n = 100)

Group	n	M	SD	t	df	p	Mean Diff. (95% CI)
3–6 months	60	21.07	6.31	3.64	86	<.001	5.10 [2.31, 7.89]
7–12 months	28	15.96	5.70	-	-	-	-

The results show the number of children, mean, and standard deviation for each cleft-repair timing group, together with the t-test statistic, degrees of freedom, significance level, and the mean difference with its 95% confidence interval.

Table 4. Descriptive Statistics and One-Way ANOVA Summary for Total Intelligibility Score by Cleft Type (N = 100)

Cleft Type	n	M	SD	SE
Unilateral Cleft Lip or Palate	37	20.19	5.55	0.91
Bilateral Cleft Lip or Palate	24	20.17	7.25	1.48
Cleft Palate Only	20	15.15	4.38	0.98
Cleft Lip Only	5	28.60	5.41	2.42
Submucous Cleft Palate	2	13.00	2.83	2.00
Complete Cleft Palate	3	13.33	5.03	2.91
Incomplete Cleft Palate	9	20.67	4.98	1.66
Total	100	19.29	6.42	0.64
One-way ANOVA: $F(6, 93) = 5.21, p < .001, \eta^2 = .25$				

Table 4. LSD Post Hoc Pairwise Comparisons of Total Score Across Cleft Types (Significant Pairs Only)

Comparison	Mean Diff.	SE	t	p
Cleft Lip Only vs. Cleft Palate Only	13.45	2.87	4.69	.001
Cleft Lip Only vs. Complete Cleft Palate	15.27	4.19	3.65	.001
Cleft Lip Only vs. Submucous Cleft Palate	15.60	4.80	3.25	.002
Cleft Lip Only vs. Unilateral Cleft Lip or Palate	8.41	2.73	3.08	.003
Bilateral Cleft Lip or Palate vs. Cleft Lip Only	-8.43	2.82	-2.99	.004
Cleft Palate Only vs. Unilateral Cleft Lip or Palate	-5.04	1.59	-3.17	.002
Bilateral Cleft Lip or Palate vs. Cleft Palate Only	5.02	1.74	2.89	.01
Cleft Lip Only vs. Incomplete Cleft Palate	7.93	3.20	2.48	.02
Cleft Palate Only vs. Incomplete Cleft Palate	-5.52	2.30	-2.40	.02
Complete Cleft Palate vs. Unilateral Cleft Lip or Palate	-6.86	3.44	-1.99	.05
Note: Sig $p < .05^*$, $p < .01^{**}$, $p < .001^{***}$				

This table combines, in a single view, every cleft-type pair whose LSD post hoc comparison reached statistical significance, listing the comparison pair alongside its mean difference, standard error, t-value, and p-value.

In Correlation Between Age Band and Total Intelligibility Score (N = 100) presents the mean and standard deviation for age band and total intelligibility score, together with the Pearson correlation coefficient between the two variables in which $r(M, SD) = .38^{**}$ $p < .001$.

In result the number of children were aged between 5.6-6 years. Children aged 3-3.5 and 3.6-4.5 years also had considerable representation, while the smallest number belonged to the 4.6-5.5 years group. The greater number of male participants (55%) than females (45%), indicating a slight male predominance in

the sample. Most children underwent cleft repair between 3-6 months of age, while fewer had the procedures after 1 year. Only one child had surgery after age 3. Children underwent cleft repair between 3-6 months of age, while fewer had the procedures after 1 year. Only one child had surgery after age 3. majority of children (76%) had 1-3 surgeries, where as 24% had between 4-7 surgeries, showing that multiple surgeries were common but limited to fewer children. Overall, 52% of children had previously received speech therapy, while 48% had no prior therapy history. Most children started therapy between 3-4 years of age. Fewer children began between 5-6 years, reflecting earlier intervention in the majority. Sessions lasting more than 12 months were the most common. Followed by those under 6 months and then 6-12 months and monthly therapy sessions were most common, while weekly and biweekly sessions were

much less frequent among participants. Half of the children had more than 12 therapy sessions, while fewer attended 6-12 or less than 5 sessions. Unilateral cleft lip or palate was the most frequent type reported, followed by bilateral cleft and cleft palate only. Less common types included Submucous, complete and incomplete cleft palate. Majority of the parents often or always understood their child's conversational speech, while very few selected "rarely", indicating high parental intelligibility perception. Most parents reported they always understood their child's single word productions, reflecting higher intelligibility at the word level than in longer utterances.

others were more likely to "sometimes" understand the child face-to-face, with fewer reporting "often" or "always". This shows moderate intelligibility for unfamiliar listeners. Most listeners reported "rarely" or "sometimes" understanding the child over the phone, showing that absence of visual cues negatively impacts speech intelligibility. Listeners showed better understanding when the child discussed familiar topics, with most responses in the "sometimes" or "often" categories. In this study, responses were concentrated in "rarely" and "sometimes", suggesting that topic unfamiliarity significantly lowers speech intelligibility for the child.

Parents reported greater intelligibility in quiet environments, as most listeners responded "sometimes" or "often", with fewer "rarely" responses.

And children's speech intelligibility was lower in noisy environment, with most responses likely falling in the "rarely" or "sometimes" categories and the responses reflect varied awareness among children regarding their speech differences, with some children showing awareness and others not.

Discussion

Since children are usually moving towards more sophisticated expressive and receptive language skills during this time, it is frequently thought to be the best time for speech intervention. 60% of the participants had cleft repair surgery between the ages of 3-6 months. This is consistent with international best-practice guidelines, such as those suggested by the American Cleft Palate-Craniofacial Association [12]. Which support better developmental outcomes by promoting early surgical intervention. Variability in post-operative speech intelligibility was noticeable, even with the right timing of surgical repairs, indicating that surgery by itself does not guarantee the best possible communicative functioning. The significant disparity in access to regular and intensive speech-language therapy was one of the most noteworthy findings [13]. The majority of the children did not receive speech therapy at the frequency or duration typically thought to be required for successful results, even though slightly more than half (52%) of them had received it. Indeed, 48% had received less than six months of therapy, and only 17.3% had weekly sessions available to them. The majority of children (78.8%) visited therapy monthly, substantially below the frequency recommended in dealing with cleft-related speech disorders like hypernasality,

compensatory articulation error, and decreased overall intelligibility [14]. These results are consistent with the views of Sell and Peterson-Falzone et al. [15], who highlighted that communication difficulties in children with cleft lip and/or palate (CLP) do not resolve by themselves without sustained, intensive, and focused intervention. Low frequency of therapy was observed alongside lower parental ratings of intelligibility; however, the cross-sectional design does not permit causal inference [15]. This lack of therapeutic support was also evident in the way parents perceived their children speech. Just 44% of parents said they "always" understood their child while they were speaking in conversation, despite 88% of parents saying they consistently understood their child's single-word utterances. These percentages dropped even more in communicative situations that were less familiar or more cognitively challenging, such discussing unfamiliar topics or approaching strangers [16]. This trend supports the assertion made by Kummer [17] that intelligibility problems are more obvious in connected than in isolated speech. Connected speech often requires higher articulation, resonance, and breath support coordination; for children with speech issues related to clefts, these could be especially challenging [17]. The type and degree of the cleft also affected the intelligibility outcomes. Parents of children with bilateral cleft lip and palate or complete cleft palate reported intelligibility score substantially lower than those of parents of children with less severe forms like cleft lip only or incomplete cleft palate. This is consistent with current research showing more severe anatomical involvement raises the likelihood of developing velopharyngeal insufficiency, a disorder causing hypernasality and inadequate production of pressure consonants. These children are also more likely to need additional surgeries later on, have prosthetic devices placed, or develop inadequate speech skills that will persist into later childhood [18]. Sell et al. [14] and Chapman et al. [20] have reported that cleft severity remains a strong predictor of structural complications with the addition of compensatory articulation behaviors that are often difficult to modify without intensive intervention. Apart from the structural and therapeutic issues, the analysis revealed important psychological elements of communication. Many children showed little initiative whether they were starting a conversation or asking questions. This finding may warrant further investigation into psychosocial aspects, although these were not directly measured in the present study [19].

These results coincide with earlier work from Hardin-Jones and Chapman in 2008 who reported that children with cleft lip and/or palate (CLP) tend to be less engaged in interactions with their peers and in class discussions. The lack of engagement was often attributed to speech-related insecurities in conjunction with social communication difficulties. This emphasizes the need of functional integration in the intervention strategy since it is not sufficient to work on articulation and resonance; social-emotional development and pragmatic language skills must also be promoted [20]. The results also point to structural barriers to appropriate care. Despite evidence of speech and

communication problems, a number of parents in the study stated that their children had never received speech therapy. This deficiency may be caused by a number of things, such as limited access to specialized services, financial obstacles, ignorance of the importance of therapy, or inappropriate referrals by medical professionals [21]. Shkoukani et al. [23] also described similar trends, especially in resource-poor environments where the availability of interdisciplinary cleft teams is limited. Another complicating factor is the overestimation by familiar listeners like parents of a child's intelligibility based on their compensatory listening strategies. This effect was noted by Morris and Ozanne [24], who highlighted the fact that familiar listeners tend to compensate for the speech of a child who is difficult to understand, perhaps underestimating the child's problem by others like teachers or clinicians [22].

Conclusion

The study concludes by emphasizing the significance of parental viewpoints in evaluating the speech intelligibility of children with cleft palates. Parents' understanding of single spoken words was found to be relatively accurate, but intelligibility diminished considerably with connected/conversational speech, emphasizing the significance of therapeutic accessibility and intensity. Such factors, it may be argued, need to be tackled through the incorporation of parent education initiatives with speech, language, and communication therapeutics provided early and at an appropriate intensity. In addition to ensuring comprehensive, family-focused, and multidisciplinary approaches to cleft care that extend beyond surgical outcome to incorporate speech and socioemotional development, it is crucial to target psychosocial factors such as communicative self-confidence.

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References

- [1] Chee-Williams JL, Liss J, Cordero KN, Scherer NJ. Examining factors that impact speech acceptability and intelligibility in 4-to 7-year-old children with cleft palate. *The Cleft Palate Craniofacial Journal*. 2026;63(3):383-94.
- [2] Jain P, Sharma R, Yadav L, Kaur S, Juneja C, Sharma D. Cleft lip and palate: A literature review and recent advances in management. *Int J Paediatr Geriatr*. 2025;8(1):5-10.
- [3] Babai A, Irving M. Orofacial clefts: genetics of cleft lip and palate. *Genes*. 2023;14(8):1603.
- [4] Baeza-Pagador A, Tejero-Martínez A, Salom-Alonso L, Camañes-Gonzalvo S, García-Sanz V, Paredes-Gallardo V. Diagnostic methods for the prenatal detection of cleft lip and palate: a systematic review. *Journal of Clinical Medicine*. 2024;13(7):2090.
- [5] Aycart MA, Caterson EJ. Advances in cleft lip and palate surgery. *Medicina*. 2023;59(11):1932.
- [6] McDonald-McGinn DM, Hain HS, Emanuel BS, Zackai EH. 22q11.2 Deletion Syndrome. 2020.
- [7] Alighieri C, Bettens K, Scheerens C, Allemeersch F, Mouton T, Hens G, et al. Diagnosis and Treatment of Speech Disorders in Children with a

Cleft (Lip and) Palate: A State-Of-The-Art Overview. *Journal of Craniofacial Surgery*. 2025;10.1097.

- [8] Pitkanen VV, Geneid A, Saarikko AM, Hakli S, Alaluusua SA. Diagnosing and managing velopharyngeal insufficiency in patients with cleft palate after primary palatoplasty. *Journal of Craniofacial Surgery*. 2025;36(3):1008-16.
- [9] Moura LB, Antoneli MZ, Passaglia IR, Yokoyama FJ, da Fonseca Sampaio EC, Alonso N. Speech Outcomes After Primary Palatoplasty and Presurgical Cleft Characteristics: Is There a Predictive Association? *Journal of Craniofacial Surgery*. 2025;36(3):862-5.
- [10] Jeon S, Park JS, Han M, Oh AK, Kim BJ, Chung JH, et al. Comparison of Speech Outcomes Between Speech Therapy Only and Double-Opposing Z-Plasty Combined with Speech Therapy in Patients with Submucous Cleft Palate. *Journal of Craniofacial Surgery*. 2025;36(3):1030-4.
- [11] Hattori Y, Lo C-C, Chen Y-J, Saito T, Chou P-Y, Lu T-C, et al. Comparison of modified Furlow palatoplasty using small double-opposing Z-plasty and conventional Furlow palatoplasty: A long-term outcome study. *Journal of Plastic, Reconstructive & Aesthetic Surgery*. 2024; 93:261-8.
- [12] Lewis CW, Jacob LS, Lehmann CU, Krol D, Gereige R, Karp J, et al. The primary care pediatrician and the care of children with cleft lip and/or cleft palate. *Pediatrics*. 2017;139(5).
- [13] Braud SC, Ryan IA, Zapatero ZD, Napoli JA. Socioeconomic Disparities in Secondary Speech Surgery Following Palatoplasty: A Global Network Study. *Journal of Craniofacial Surgery*. 2025;10.1097.
- [14] Bessell A, Sell D, Whiting P, Roulstone S, Albery L, Persson M, et al. Speech and language therapy interventions for children with cleft palate: a systematic review. *The Cleft Palate-Craniofacial Journal*. 2013;50(1):1-17.
- [15] Peterson-Falzone SJ, Hardin-Jones MA, Karnell MP, McWilliams JB. Cleft palate speech. St. Louis: Mosby; 2001.
- [16] Larsson A. Internationally adopted children with unilateral cleft lip and palate. 2020.
- [17] Kummer A. Cleft palate and craniofacial anomalies: effect on speech and resonance. 3rd ed. Delmar Cengage Learning, NY; 2014:597-602.
- [18] Hardin-Jones MA, Chapman KL. Non-oral compensatory misarticulations revisited. *The Cleft Palate Craniofacial Journal*. 2022;59(8):976-83.
- [19] Hardin-Jones MA, Chapman KL, Wright J, Halter KA, Schulte J, Dean JA, et al. The impact of early palatal obturation on consonant development in babies with unrepaired cleft palate. *The Cleft Palate-Craniofacial Journal*. 2002;39(2):157-63.
- [20] Hardin-Jones M, Chapman KL. The impact of early intervention on speech and lexical development for toddlers with cleft palate: a retrospective look at outcome. *Language, Speech, and Hearing Services in Schools*. 2008;39(1):89-96.
- [21] Baigorri M, Crowley CJ, Sommer CL, Moya-Galé G. Barriers and resources to cleft lip and palate speech services globally: a descriptive study. *Journal of Craniofacial Surgery*. 2021;32(8):2802-7.
- [22] Chee-Williams JL, Liss J, Cordero KN, Scherer NJ. Examining Factors That Impact Speech Acceptability and Intelligibility in 4-to 7-Year-Old Children with Cleft Palate. *The Cleft Palate Craniofacial Journal*. 2025;10556656251400868.
- [23] Shkoukani MA, Lawrence LA, Liebertz DJ, Svider PF. Cleft palate: A clinical review. *Birth Defects Research Part C: Embryo Today: Reviews*. 2014;102(4):333-342. doi:10.1002/bdrc.21083
- [24] Morris H, Ozanne A. Phonetic, phonological, and language skills of children with a cleft palate. *The Cleft Palate-Craniofacial Journal*. 2003;40(5):460-470. doi:10.1597/1545-1569_2003_040_0460_ppalzo_2.0.co_2.

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- All Authors Conceptualization, data collection, interpretation, drafting of the manuscript and intellectual revisions
- The authors agree to take responsibility for every facet of the work, making sure that any concerns about its integrity or veracity are thoroughly examined and addressed

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