


Systematic Literature Review: Speech Intelligibility In Children With Repaired Cleft Lip Palate

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Article Info	ABSTRACT
Keywords: Cleft lip palate Intelligibility in context scale Speech intelligibility Percentage consonant correct	Children with cleft lip and/or palate (CLP) frequently experience difficulties with speech and language development. Changes in the orofacial anatomical structure cause these issues, which lead to a restricted ability to articulate. Cleft lip and palate repair involves a variety of surgical techniques to restore function and a more normal appearance. This repair does not always result in normal function of the lip and palate, so these children usually present with speech difficulties even after surgery. Determining the speech intelligibility of CLP children who had undergone surgery was the goal of this investigation. The method used was to analyze the literature by searching for relevant articles on Pubmed, Wiley and Google Scholar. Several reviews showed that speech intelligibility comprehension, measured using the Context Intelligibility Scale (CIS), depends on the proximity of the communication partner to the child. Although children with CLP have undergone surgery, speech therapy is still needed to help them improve speech intelligibility
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INTRODUCTION

One congenital craniofacial abnormality that affects 1 in 1000 babies born in America is cleft lip and palate (Lima, et al 2015). Cleft lip and palate affects 1.9 out of every 1,000 live births in eastern Iran (Kianifar, 2015). Cleft lip is more common in men than in women, with a 3:2 male to female ratio (Nyberg et al, 2014)

Children who have cleft lip and/or palate (CLP) frequently struggle with speech and language development. Changes in the orofacial anatomical structure limit the child's capacity for speech. Limitations in vocabulary development, as well as in syntactic and morphological skills, are also the cause of language development issues. A strong vocabulary is necessary for the development of language abilities, thus if this area is troublesome, it may result in additional language development impairments (such as grammatical skills) and issues at school (Meinusch and Romonath, 2012).

Several techniques are used in cleft lip and palate surgery to restore function and a more normal appearance. According to Bicknell et al. (2002), these restorations do not necessarily

lead to normal lip and palate function, and even after surgery, these children typically have speech problems. Sell et al. (2001) identified speech difficulties, hypernasality, and consonant mistakes in their thorough investigation of speech outcomes in children with unilateral cleft lip and palate. Nearly two-thirds of the children had received speech treatment.

Speech therapy is required to enhance communicative function in children with cleft lip and palate because they exhibit a variety of speech and language impairments. Enhancing speech intelligibility is one of speech therapy's primary objectives. Although some children are not sent for speech treatment following surgery, Lockhart claims that about 50% of children with cleft lip and palate need speech therapy (Lockhart, 2003).

METHODS

This research is a systematic analysis of the literature. It aims to combine the results of different independent studies and produce a statistical overview of the findings. Google Scholar, Science Direct, and PubMed were among the databases from which search results were obtained. utilizing "cleft lip and palate" AND "speech intelligibility" as search terms.

RESULTS AND DISCUSSION

Result

Titles and abstracts of papers searched in Pubmed, Wiley and Google Scholar were reviewed for inclusion. 207 papers were excluded because they did not meet the inclusion criteria, e.g. the year of publication of the literature was less than the last ten years, the research design did not use survey methods, the research study examined different aspects and the literature did not meet the criteria for conducting a critical literature review. In addition, 4 documents were found that met all the inclusion criteria, which are presented in the following table:

Table 1. Results of article review

No	Author	Year	Sample characteristics	Study Design	Result
1	Safaiean (2017)	2016	The respondents in this study were 32 children aged 3 to 5 with cleft lip and palate.	Cross-sectional study design	Children with cleft lip and palate (CLP) can understand speech to a moderate degree. More than half of children have speech that is unintelligible. Children made compensation errors frequently (59.4%).

No	Author	Year	Sample characteristics	Study Design	Result
					<p>PCC and speech intelligibility were shown to be significantly correlated.</p> <p>The degree of speech intelligibility is correlated with the intensity of hypernasality.</p> <p>For better results, early intervention in speech therapy is crucial.</p> <p>Following surgery, the participants did not get early speech therapy assistance.</p>
2	Mariswamy <i>et al</i> (2021)	2021	Twenty Children with cleft lip and palate repairs made up the sample. As many males as girls were present. The participants were between the ages of 6 and 12.	Cross-sectional study design	<p>Resonance does not significantly differ between words and phrases.</p> <p>Words and phrases did not differ in speech comprehensibility.</p> <p>There was no change in speech acceptability across the various stimuli.</p> <p>Acceptability, speech comprehensibility, and resonance were found to be strongly correlated.</p>

No	Author	Year	Sample characteristics	Study Design	Result
					<p>The inter-rater reliability was higher among the raters.</p> <p>Twenty children with cleft palate repairs participated in the study.</p> <p>Native Kannada speakers between the ages of 6 and 12 participated.</p> <p>The study excluded children with intellectual or hearing impairments.</p> <p>For evaluation, a four-point rating system was employed.</p> <p>Speech parameters were barely impacted by the stimulation.</p>
3	Malmenholt (2018)	2018	There were eighty-eight children in the sample. There were fifty-two children with speech production in the final sample.	Prospective Cohort Study	<p>Children with CLP had orofacial impairment in 37% of cases.</p> <p>In 39% of youngsters, the articulation was appropriate for their age.</p> <p>More over half earned high intelligibility ratings.</p>

No	Author	Year	Sample characteristics	Study Design	Result
					<p>Orofacial function and articulation control did not significantly correlate.</p> <p>The evaluation of intelligibility and articulation control are significantly correlated. Children with CLP are most likely to have articulation issues.</p> <p>Orofacial function differs depending on the type of cleft.</p>
4	Bettens et al (2020)	2020	There were 69 children between the ages of 7 and 12 who responded.	prospective study design	<p>There is a positive correlation between speech intelligibility and peer attitudes.</p> <p>Nasal airflow, articulation mistakes, and hypernasality all contributed to negative attitudes.</p> <p>Negative attitudes were more prevalent among younger children.</p> <p>Boys showed more negative attitudes than girls.</p> <p>Mild hypernasality often goes unnoticed by peers.</p>

No	Author	Year	Sample characteristics	Study Design	Result
					Interventions are needed to improve peer attitudes towards children with CLP.
					Social difficulties are common in children with CLP.
					Age and gender influence peer attitudes toward children with CLP.

Discussion

Surgery is necessary to help children with cleft lip and palate (CLP) develop their oral motor skills so they can communicate correctly. Due to the accompanying velopharyngeal dysfunction, speech difficulties persist after surgery, making speech therapy essential in the management of CLP children who have had surgery. Malmeholt (2018) discovered that children with CLP had a higher prevalence of orofacial issues, but the kind of cleft was unable to account for this higher occurrence.

Children with RCLP (Repaired CLP) frequently make speech errors that impair overall speech intelligibility, including hypernasality, unusual consonant production, and aberrant airflow. According to studies by Mariswamy et al. (2021), hypernasality influences speech intelligibility in children with corrected CLP, indicating a linear link between resonance, speech comprehension, and speech acceptance in words and sentences. Using the Intelligibility in Context (ICS) scale, speech therapists and parents evaluated the patient's speech intelligibility, each of which represented a significant component of the patient's communication efficacy in daily life.

According to the findings of the ICS, which parents completed, parents were the ones who understood their children's speech the best, while outsiders had the lowest comprehension rates. According to Seifert et al. (2021), children with cleft lip were more frequently understood than those with cleft palate. Parent evaluations of the percentage of correct consonants (PCC) metric show that the average ICS scores for children with speech issues are lower. Speech problems may be portrayed in the PCC score due to the listener's familiarity, in this example the parents. In addition to orofacial dysfunction, children with bilateral cleft lip and palate (BCLP) and submucosal cleft palate (SMCP) also had speech issues (71%, n = 5).

This is due to the fact that the neuroanatomical base (Broca's area) supports the interaction between the language and motor systems in SLI (Britton, 2014).

According to the research findings of Seifert et al. (2021), children with CLP have speech that is difficult for strangers to comprehend yet frequently understandable by their parents. According to the same findings by Wren et al. (2016), children's speech was hard for strangers to understand by the age of three, and this was a predictor of speech difficulties. However, it is unclear if the incapacity of strangers to comprehend children at age three is a significant predictor of children with CLP.

McLeod et al. (2015) examined intelligibility in 803 children aged 4.0 to 5.5 using an ICS. A similar pattern was observed in the study, where speech intelligibility declined with the communication partner's level of familiarity with the child. According to the research, only 10.9% of moms claimed that outsiders could always understand their child's speech, compared to 39.1% of mothers and 21.6% of direct relatives.

Peers' negative attitudes are a result of youngsters with CLP speaking incoherently. In children with CLP, there were significant correlations found between all three characteristics of peer attitudes and speech intelligibility, hypernasality rate, audible nasal airflow, and articulation errors (Bettens et al, 2020). Focusing on both internal and external causes, intervention is required. The psychosocial development of children with CLP requires therapists to more constructively influence peers' cognitive, affective, and behavioral perspectives.

CONCLUSION

Intelligibility in Context (ICS) scale for speech intelligibility, depends on the proximity of the communication partner to the child. Although children with CLP have undergone surgery, speech therapy is still needed to help them improve speech intelligibility.

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