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Original Article

Early language development and phonetic repertoire in children with unrepaired cleft lip and palate: A preliminary study

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ABSTRACT

Background: The development of pre-speech vocalizations, from the period of canonical babbling, is important for a child to develop speech and language. This is the stage when infants produce strings of consonant-vowel combinations with adult-like intonation patterns. **Aims:** The current study was aimed at analyzing the vocalizations of children with unrepaired cleft palate to compare the distribution of consonants, vowels, and syllable structures; and the development of receptive and expressive language with respect to age and gender matched typically developing children. **Materials and Methods:** Vocalizations of 10 children between 11 and 18 months of age with and without cleft of the palate were recorded during play and interaction with their mothers. One thousand utterances were transcribed using International Phonetic Alphabets by a speech language pathologist and analyzed for the above parameters. Language development was assessed using three-dimensional language acquisition test. **Statistical Analysis:** Mann–Whitney test was used to analyze the significance of differences between the two groups. **Results:** Statistically significant differences were obtained in the distribution of vowels and consonants among the utterances. The pattern of consonants and vowels noticed in children with cleft reflected the effects of structural constraints on sound production. An expressive language delay of 2-6 months was evidenced among children with cleft, though not statistically significant. **Conclusion:** Differences in prespeech vocalizations are noticed in children with cleft compared to typically developing children. The results highlighted the need for early intervention in children with cleft palate.

Key words: Cleft palate, expressive language, receptive language, vocalizations

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INTRODUCTION

Children with cleft lip and palate (CLP) have a range of communication disturbances due to their physical challenge for acquisition of spoken language. Delays have been reported in expressive language and in acquiring the phonetic and phonological features of speech production.[1] The earliest period during which expressive deficits are revealed in children with CLP is the canonical babbling period.[2-4] Canonical babbling is the stage of prespeech vocalization that appears between 7 and 10 months, during which the child produces repetitive sequences of consonant-vowel syllables.[5] This is considered as one of the major milestones in vocal development that has a continuous relationship with language development. The beginning of speech and language development is marked by changes in prosody and form of babbling. The current study is aimed at comparing the development of speech and language in children with unrepaired cleft of the palate with that of typically developing children.

There is a deficit in the onset, frequency, and structure of sounds appearing during babbling and early vocalizations in children with CLP.[6,7] The effects on speech and language development can be noticed irrespective of the type of cleft palate.[8] Their consonant inventory consists predominantly of vowels, nasals, glides, and stops produced at the level of lips (bilabials), soft palate (velars), or glottis (glottals).[3,9-11] Children with CLP show difficulty in producing pressure consonants namely stops, fricatives, and affricates. There is also a predominance of glottal stops during prespeech vocalizations in these children. The altered productions seen during the early stages could be attributed to their inability to build intraoral pressure required for the production of pressure consonants.[12] The reduced variety of sounds and combinations produced may make these children susceptible for expressive language delay.[13]

Recent literature on early language development in children with CLP indicate a delayed development of first word and early expressive vocabulary.[7,14] These children demonstrate lexical selectivity, wherein they choose words based on certain phonological patterns. They produce more words beginning with nasals, vowels, and glides. Words beginning with oral stop consonants are produced with a reduced frequency when compared to children without CLP.[14] Further, children with cleft palate produce words with sounds more at the periphery of the oral tract, unlike typically developing children who produce words with more of sounds at the center of the oral tract.[15] Scherer explored the capacity of children with cleft to learn words based on their inventory of speech sounds.[7] The study revealed that young children with cleft learned words faster if the sounds were within their repertoire of consonants. Studies have demonstrated a relationship between the vocalization and the acquisition of words in children with cleft.[6] The frequency of vocalizations at 6 months of age has been found to significantly correlate with vocabulary size at 30 months.

The literature thus provides evidence on the presence of delayed speech and language in children with unrepaired CLP. Early intervention facilitates to reduce the possibility of such delays.[16] It is also found that cultural differences and involvement of parents will affect speech and language development and progress of children.[14] Hence, there is a need for culture-specific information. In the Indian scenario, Raman, Jacob, Jacob, and Nagarajan analyzed the language development of 100 toddlers with cleft between the ages of 0 and 3 years and specified that 68% of children demonstrated delayed or inadequate expressive language skills.[17] This clearly highlights the need for early intervention programs addressing on issues relating to language development. As a preliminary step toward the development of such programs, there is a need to profile the utterances in children with CLP. This study was hence designed to analyze the patterns of speech and language development in Tamil speaking children with CLP. The specific objectives were to analyze and compare the early utterances of children with unrepaired cleft of palate with respect to the distribution of consonants, vowels, and syllable structures; and the development of receptive and expressive language.

MATERIALS AND METHODS

The participants included two groups of children, viz., clinical and nonclinical group. The clinical group consisted of five children with nonsyndromic CLP with unrepaired unilateral cleft of the palate (primary and secondary palate) in the age range of 10-18 months. Only one child had unrepaired bilateral CLP. The nonclinical group consisted of five typically developing children, matched for age and gender with those of the clinical group. Children diagnosed as well babies by pediatricians from the immunization clinic of a tertiary care hospital were recruited for the nonclinical group. All children were exposed to Tamil as the primary language and had normal hearing sensitivity (minimal hearing level of 25 dB HL on visual reinforcement audiometry) and developmental quotient. None of the participants had any history of ear discharge. Table 1 summarizes the demographic details of the participants of the study.

Procedure

Consent to participate in the study was obtained from parents of all children selected. Video recording of vocalizations and productions of each child was carried out while they were involved in play with their mothers. It was ensured that the child was fed and was in a comfortable state during the recording. The primary language used during interaction was Tamil, a Dravidian language commonly spoken in the state of Tamil Nadu. All mothers were provided with the same set of materials for interacting with their child. The materials included a set of nonstandardized toys such as balls, car, and mobile dolls. All the toys were attractive and could be manipulated by the children. Before commencing the study, the investigator used the set of toys with five typically developing 1-year-old children to ensure that they captivated attention and aroused interest among children.

During video recording, the mother was asked to interact and play with the child using the toys provided by the investigator. The investigator did not interact with the child unless there was less participation from the mother. The interactions were video recorded in a sound-treated room using a Sony handycam DCR-DVD 805 E. A bluetooth microphone was used to ensure

Table 1: Demographic details of the participants of the study

Clinical group		Nonclinical group	
Gender	Age in months	Gender	Age in months
Male	11	Male	11
Male	15	Male	15
Female	14	Female	14
Female	16	Female	16
Female	18	Female	18

good signal quality. The duration of each session was approximately 1 h. A break was provided in between the session if the child got restless. The language test three-dimensional language acquisition test (3D-LAT) was administered to obtain the cognitive age, receptive and expressive language age of the child.[18]

Data analysis

The utterances of children obtained in the recordings were transcribed using International Phonetic Alphabet by the investigator, who was a speech language pathologist.[19] The segments containing consonants or vowel-like productions were transcribed from the available sample. Nonspeech vocalizations like crying, laughing, coughing, and sighing were excluded for analysis. One thousand speech vocalizations/utterances (100 from each child) were used for analysis. The transcriptions were analyzed and the two groups of children were compared for percentage of occurrences of vowels and consonants, distribution of vowels across tongue advancement and height, distribution of consonants across place and manner of articulation, percentage of monosyllables versus polysyllables, and the receptive and expressive language age (as obtained from 3D-LAT). Mann-Whitney, a nonparametric test of significant differences, was used to analyze the significance of differences between the two groups.

Reliability

In order to ascertain the reliability of the transcriptions, the recordings were transcribed independently by another speech language pathologist who was not involved in executing the study and had 2 years of experience in assessing children with CLP. To assess the intra-rater reliability, the investigator repeated the transcriptions of all the utterances with a gap of 1 month between the two transcriptions. A point to point method was used to find the reliability of transcription of the utterances.

RESULTS

The transcribed samples had an intra-rater reliability of 82.6% and inter-rater reliability of 80.8%. This revealed that there was good agreement between the transcriptions of the two speech pathologists and they were reliable to be used for further analysis.

Percentage of occurrence of vowels and consonants

The distribution of vowels and consonants across each child is depicted in Figure 1. The analysis revealed a higher production of vowels in the clinical group

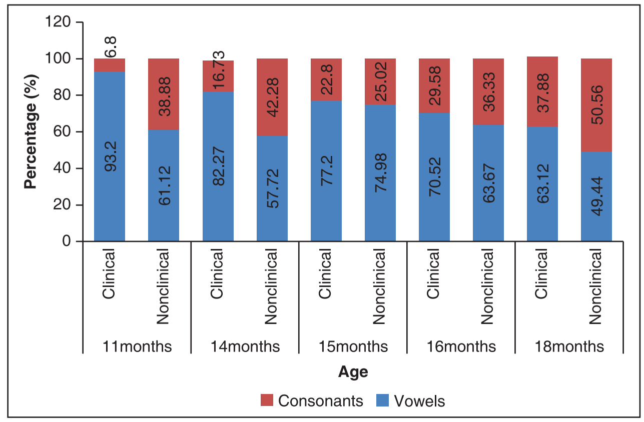

Figure 1: Percentage of occurrence of vowels and consonants

(Mean [M]: 77.26; standard deviation [SD]: 11.8) compared to the nonclinical group (M: 55.59; SD: 4.8). In the clinical group, though the frequency of occurrence of consonants was lesser than vowels in each age, there was an increase in the percentage of consonants with increasing age. This indicated a developmental pattern in the clinical group. Nonparametric Mann-Whitney test revealed a significant difference in the percentage of occurrence of vowels and consonants ($p = 0.009$) in the two groups.

Distribution of vowels across tongue advancement and height

Figure 2 depicts the distribution of vowels across tongue advancement for all children of the study. Vowels are classified on the basis of tongue advancement and height into front, central, back and open, open mid, close, close-mid, respectively.[19] Analyzing the distribution of vowels across tongue advancement depicted that children in both the clinical and nonclinical groups had more of front and central vowels than the back vowels. This revealed that children in the clinical group followed a similar pattern as that of typically developing children with respect to the distribution of vowels according to tongue advancement. In spite of a similar pattern, the children in the clinical group had a comparatively greater occurrence of back vowels (M: 21.7, SD: 5.6) than the nonclinical group (M: 7.07, SD: 7.2). This difference in the occurrence of back vowels was found to be statistically significant ($p = 0.014$). The structural constraints caused due to CLP could lead to the higher productions of back vowels in children with CLP.

Table 2 depicts the distribution of vowels according to tongue height across all the children. Children in the clinical group had more production of open and open-mid type of vowels when compared to the nonclinical group. The nonclinical group had a higher production of close vowels, though this was not statistically significant. The statistical analysis revealed a significant difference only in the production of open-mid vowel ($p = 0.009$).

Distribution of consonants across place and manner of articulation

Overall, children in the clinical group produced lesser variety of consonants when compared to those in the nonclinical group. The distribution of consonants with respect to place of articulation obtained in this study is depicted in Table 3. Consonant productions of children in the clinical group were predominantly restricted to sounds produced in the extremes of the vocal tract. Glottal sounds had the highest frequency of occurrence followed by bilabials. The occurrence of glottal stop was higher among children of the clinical group (M: 9.7, SD: 4.5) when compared to that of the nonclinical group (M: 2.3, SD: 2.4). This difference in the production of glottal stops was found to be statistically significant ($p = 0.016$) using the Mann-Whitney test.

Table 4 shows the distribution of consonants in terms of the manner of articulation. Stop consonants occurred maximally in both the group of children. However, the frequency of occurrence of stop consonants was higher among typically developing children (M: 25.5, SD: 5.6) when compared to children with cleft (M: 8.35, SD: 9.9). Statistical analysis using nonparametric Mann-Whitney test revealed a significant difference in the production of stops ($p = 0.047$). Nasal consonants were produced maximally following the stop consonants in children with cleft. Analysis of the current data also indicated

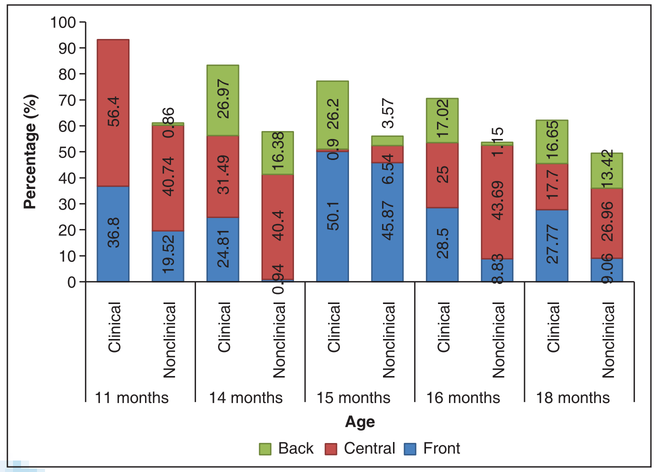

Figure 2: Distribution of vowels according to advancement of the tongue

Table 2: Distribution of vowels according to height of the tongue

Age in months	Rank order of vowels (in decreasing order in percentage)	
	Clinical group	Nonclinical group
11	Open (56.4), close (20.2), open mid (16.6)	Open (34.14), close (24.27), open mid (15.51), close mid (9.59)
14	Close (21.27), open (22.3)	Open (40.4), close (10.53), open mid (6.79)
15	Open mid (24.6), open (21.9), close (16.6), close mid (12.5)	Close (29.78), open (21.49), open mid (4.71)
16	Open (30), close (20.39), open mid (19.33)	Open (43.31), close (9.22), open mid (1.19)
18	Open (25.7), open mid (21.7), close mid (8.67), close (6.05)	Open (26.96), close (15.38), close mid (6.12), open mid (0.98)

#Open: [a], [ɑ]; Open mid: [æ], [Ɛ], [ɔ]; Close mid: [e], [o]; Close: [i], [u], [i]

Table 3: Rank order of consonants with respect to place of articulation

Age (in months)	Rank order of consonants (in decreasing order in percentage)	
	Clinical group	Nonclinical group
11	Glottal (6.8)	Palatal (26.42), velar (7.1), bilabial (2.86), glottal (2.5)
14	Glottal (8.53), bilabial (7.5), alveolar (0.7)	Bilabial (13.8), velar (11.25), alveolar (11.1), labiodental (4.3), palatal (1.2), glottal (0.63)
15	Bilabial (8.3), glottal (7.7), velar (6.8)	Bilabial (8.3), velar (6.8), alveolar (15.82), glottal (7.7), labiodental (5.4)
16	Bilabial (8.3), glottal (7.7), labiodental (5.4), velar (6.8)	Velar (21.8), bilabial (17.2), alveolar (4.6), palatal (2.3), glottal (0.38)
18	Bilabial (18.5), glottal (17.78), alveolar (1.05), labiodental (0.52)	Bilabial (16.3), alveolar (15.26), palatal (10.42), labiodental (4.7), velar (3.88)

Table 4: Rank order of consonants with respect to the manner of articulation

Age (in months)	Rank order of consonants (in decreasing order in percentage)	
	Clinical group	Nonclinical group
11	Stop (3.4), fricative (3.4)	Stop (34.5), fricative (2.5), nasal (1.72), affricate (0.28)
14	Nasal (7.5), fricative (5.03), stop (4.2)	Stop (23.3), nasal (12.1), fricative (4.9), glide (1.2), lateral (0.74)
15	Nasal (15.1), fricative (4.3), stop (3.4)	Stop (19.8), nasal (13.3), fricative (9.33), glide (1.59)
16	Glide(15.6), fricative (8.5), stop (5.4), nasal (0.78)	Stop (27.2), nasal (16.4), glide (2.3), fricative (0.38)
18	Stop (26.1), nasal (11.26), fricative (0.52)	Stop (22.8), nasal (11.8), affricate (9.9), fricative (5)

that the occurrences of sounds like fricatives, affricates, glides, and laterals were higher in the nonclinical group, though it was not statistically significant.

Comparison of monosyllables and polysyllables

Children with cleft produced lesser percentage of polysyllables when compared to the typically developing children. Figure 3 represents the percentage of occurrence of monosyllables and polysyllables in the two groups. The polysyllabic utterances were appreciated only by the age of 16 months in children with cleft. This difference between the two groups was found to be statistically significant ($p = 0.009$). Both the groups showed higher productions of polysyllabic utterances among older children. The polysyllabic utterances in the clinical group were restricted to the structure of VCV while children in the nonclinical group revealed a variety of structures including VCV, CVCCV, VCCV, and VCCVCCV.

Receptive and expressive language levels

Table 5 depicts the language and cognitive ages of the participants of the study, as obtained using 3D-LAT. Assessment of language and cognitive abilities of the children using 3D-LAT revealed that the receptive and cognitive abilities of the children were age appropriate for both the groups. An expressive language delay of 2-6 months was evidenced among children with cleft. However, statistical analysis done using nonparametric Mann–Whitney test revealed no significant difference in all three measures of receptive language age ($p = 0.26$), expressive language age ($p = 0.23$), and cognitive age ($p = 0.28$).

DISCUSSION

The results indicated that children with unrepaired cleft palate had an overall reduction of utterances when compared to the typically developing children. Their utterances had a higher proportion of vowels than consonants when compared to the age-matched peers. Similar findings have also been reported in the literature.[10,11,13] This could be attributed to the relative ease of vowel production when compared to the consonants. The production of consonants requires a more complex control and management of intraoral breath pressure.[20] The proportion of consonants in comparison with that of vowels increased with age, indicating a delayed developmental pattern. The developmental trend of consonants increasing with age has also been demonstrated in typically developing Kannada speaking children.[21] The structural constraints caused due to clefting resulted in children with CLP using a higher proportion of back vowels.

The analysis of consonants revealed that children with cleft had smaller consonantal repertoires compared to their peers. Studies in literature have also reported similar findings.[9,11] In the present study, children with cleft produced more of glottal productions than the anterior sounds. The variety of consonants produced by children with cleft was restricted predominantly

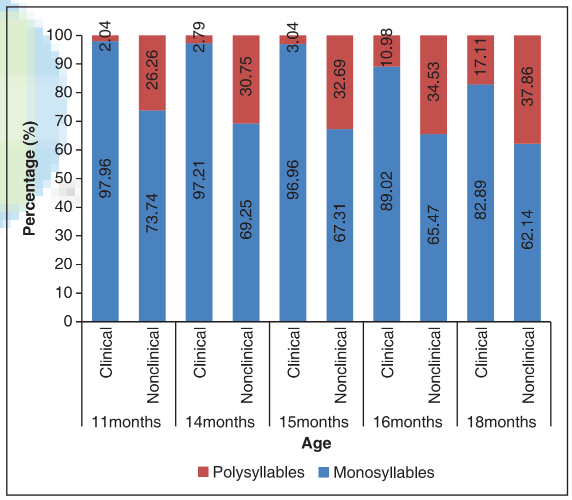

Figure 3: Percentage of occurrence of monosyllables and polysyllables

Table 5: 3D-LAT findings in clinical and nonclinical group

S. no.	ID No.	Chronological age (in months)	3D-LAT findings		
			RLA* (in months)	ELA* (in months)	CA* (in months)
Clinical group	1	11	9-11	Below 9	9-11
Nonclinical group	1	11	9-11	9-11	12-14
Clinical group	2	15	12-14	9-11	15-17
Nonclinical group	2	15	15-17	15-17	15-17
Clinical group	3	14	12-14	9-11	12-14
Nonclinical group	3	14	15-17	15-17	15-17
Clinical group	4	16	15-17	15-17	15-17
Nonclinical group	4	16	15-17	15-17	15-17
Clinical group	5	18	15-17	15-17	15-17
Nonclinical group	5	18	18-20	18-20	18-20

*RLA: Receptive language age, *ELA: Expressive language age, *CA: Cognitive age, 3D-LAT: Three-Dimensional Language Acquisition Test to the ones produced in the extremes of the vocal tract. The increased use of glottal productions could probably be a mechanism adopted to compensate for the improper oronasal coupling due to velopharyngeal inadequacy in children with CLP.[22] The compensatory glottal productions could also get established because of parents reinforcing the abnormal productions instead of modeling the sounds with correct place of articulation.[23] Higher productions of glottal utterances have also been reported in the literature.[6,10] Among the manner of articulation, children with cleft produced maximum stop consonants followed by nasals. Though stop consonants were maximally produced similar to typically developing children, their frequency of production was compromised in individuals with CLP. This decreased production of stop consonants, especially at the center of the oral cavity reflects the inability to build intraoral breath pressure required for production of stop consonants. Higher production of nasals has been reported in children with cleft.[9,11]

Apart from reduction in speech sound inventory, children with cleft also demonstrated variations in the syllable structures used. The patterns of syllable structures in children with cleft were similar to the ones observed in typically developing children. However, decreased use of polysyllables and presence of simple syllable structures (V, CV, and VCV) marked the utterances of children with cleft. The syllable structures observed in typically developing children reflected the common structures of Tamil language. The reduced variety of consonants produced and the difficulty in building intraoral breath pressure required for speaking longer utterances could be factors that contribute to simplified structures used by children with cleft.[24]

In this study, children with CLP demonstrated a delay of 2-6 months with respect to expressive language development, though this was not statistically significant. The lack of statistical significance between the two groups could be because of the small sample size employed in this study. Studies in the literature have also revealed that language difficulties in children with cleft are restricted predominantly to expressive language.[14,25] The expressive language deficits are also commonly evidenced only by the age of 36 months or during the period when there is rapid vocabulary development.[26] Further, one of the major reasons attributed for language delay in children with CLP is hearing loss.[27] These children are prone to middle ear effusion, which is often accompanied by hearing loss of mild to moderate degree.[28] However, all children who participated in this study demonstrated minimal hearing levels within normal limits and had no history of ear discharge.

The results of this study, though preliminary, highlight the effects of cleft on early speech and language development. It can be interpreted from the findings that there is a need for early intervention in children with cleft focusing on increasing the speech sound repertoire. Analyzing the language development of children with cleft using a longitudinal study design will throw more light into the parameters that are to be considered while developing such early intervention modules.

REFERENCES

1. McWilliams BJ, Morris HL, Shelton RL. Cleft Palate Speech. Philadelphia: BC Becker; 1990.
2. Willadsen E, Albrechtsen H. Phonetic description of babbling in Danish toddlers born with and without unilateral cleft lip and palate. Cleft Palate Craniofac J 2006;43:189-200.
3. Jones CE, Chapman KL, Hardin-Jones MA. Speech development of children with cleft palate before and after palatal surgery. Cleft Palate Craniofac J 2003;40:19-31.
4. Lohmander-Agerskov A, Söderpalm E, Friede H, Persson EC, Lilja J. Pre-speech in children with cleft lip and palate or cleft palate only: Phonetic analysis related to morphologic and functional factors. Cleft Palate Craniofac J 1994;31:271-9.
5. Stoel-Gammon C. Prelinguistic vocalizations of hearing-impaired and normally hearing subject: A comparison of consonantal inventories. J Speech Lang Hear Res 1988;53:302-15.
6. Scherer NJ, Williams AL, Proctor-Williams K. Early and later vocalization skills in children with and without cleft palate. Int J Pediatr Otorhinolaryngol 2008;72:827-40.
7. Scherer NJ. Early Vocalization and Later Speech Production in Children with Cleft lip and/or Palate. Presented at the 9th International Congress on Cleft Lip Palate and Related Craniofacial Anomalies; Gothenburg. Sweden; 2001.
8. Hardin-Jones M, Chapman KL, Schulte J. The impact of cleft type on early vocal development in babies with cleft palate. Cleft Palate Craniofac J 2003;40:453-9.
9. Chapman KL, Hardin-Jones M, Schulte J, Halter KA. Vocal development of 9-month-old babies with cleft palate. J Speech Lang Hear Res 2001;44:1268-83.
10. O'Gara MM, Logemann JA. Phonetic analyses of the speech development of babies with cleft palate. Cleft Palate Craniofac J 1988;25:122-34.
11. Chapman KL. Vocalizations of toddlers with cleft lip and palate. Cleft Palate Craniofac J 1991;28:172-8.
12. Willadsen E, Enemark H. A comparative study of prespeech vocalizations in two groups of toddlers with cleft palate and a noncleft group. Cleft Palate Craniofac J 2000;37:172-8.
13. Salas-Provance MB, Kuehn DP, Marsh JL. Phonetic repertoire and syllable characteristics of 15 month old babies with cleft palate. J Phon 2003;31:23-8.
14. Lu Z, Ma L, Luo Y, Fletcher P. The effects of unrepaired cleft palate on early language development in Chinese infants. Cleft Palate Craniofac J 2010;47:400-4.
15. Estrem T, Broen PA. Early speech production of children with cleft palate. J Speech Lang Hear Res 1989;32:12-23.
16. Scherer NJ, D'Antonio LL, McGahey H. Early intervention for speech impairment in children with cleft palate. Cleft Palate Craniofac J 2008;45:18-31.

17. Raman S, Jacob M, Jacob MS, Nagarajan R. Providing intervention services for communication deficits associated with cleft lip and/or palate - A retrospective analysis. Asia Pac Disabil Rehabil J 2004;15:122-9.
18. Herlekar G, Karanth P. 3-D language acquisition test (3D-LAT): Evaluation of language within a pragmatic framework. In: Bai BL, Vasanta D, editors. Language Development and Language Disorders: Perspectives from Indian Languages: Proceedings of an Interdisciplinary National Seminar Organized by the Centre of Advanced study in Linguistics, Osmania University, Hyderabad, during February 16-18, 1989. New Delhi: Centre of Advanced Study in Linguistics, Osmania University and Bahri Publications; 1995. p. 197-210.
19. The International Phonetic Alphabet; 2005. Available from: https://www.langsci.ucl.ac.uk/ipa/IPA_chart_(C)2005.pdf. [Last retrieved on 2013 Nov 16].
20. Borden GJ, Harris KS. Speech Science Primer. Physiology, Acoustics and Perception of Speech. 1st ed. Baltimore: Williams and Wilkins; 1980.
21. Anjana S, Sreedevi N. The phonetic characteristic of babbling in Kannada. Vol. 11. Mysore: In Student Research at AIISH; 2008. p. 18-34.
22. D'Antonio LL, Scherer NJ, Miller LL, Kalbfleisch JH, Bartley JA. Analysis of speech characteristics in children with velocardiofacial syndrome (VCFS) and children with phenotypic overlap without VCFS. Cleft Palate Craniofac J 2001;38:455-67.
23. Bradford GJ, Culton LG. Parent's perceptual preferences between compensatory articulation and nasal escape of air in children with cleft lip and palate. Cleft Palate Craniofac J 1987;24:299-303.
24. Peterson-Falzone SJ, Hardin-Jones MA, Karnell MP. Cleft Palate Speech. 4th ed. Missouri: Mosby Elseiver; 2007.
25. Long NV, Dalston RM. Comprehension abilities of one year old infants with cleft lip and palate. Cleft Palate Craniofac J 1983;20:303-6.
26. Neiman GS, Savage HE. Development of infants and toddlers with clefts from birth to three years of age. Cleft Palate Craniofac J 1997;34:218-25.
27. Jocelyn LJ, Penko MA, Rode HL. Cognition, communication, and hearing in young children with cleft lip and palate and in control children: a longitudinal study. Pediatrics 1996;97:529-34.
28. Broen PA, Moller KT, Carlstrom J, Doyle SS, Devers M, Keenan KM. Comparison of the hearing histories of children with and without cleft palate. Cleft Palate Craniofac J 1996;33:127-33.

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