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Phonetic and Phonological Skills of Three to Five Year Old Telugu Speaking Cleft Palate Children

Udayashree Bhatt, M.Sc. (ASLP)

Abstract

Introduction: The acquisition of a phonological system entails learning both the phonetic and phonological features of language. The children must not only learn to articulate sounds and sound sequences correctly (phonetic mastery) but also they must use the sounds in accordance with phonological patterns of the adult language. In many instances the two aspects of acquisition are not in synchrony, with phonological learning preceding phonetic mastery.

Aim: The aim of the study was to study the percent of consonants correct, type and

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Children

frequency of phonological processes and the “compensatory” articulation patterns occurring in speech of 3-5 years old Telugu speaking cleft palate children and matched typically developing in the age range of 3-5 years.

Method: Sixty native Telugu speaking children between 3 to 5 years of age were included. The subjects were divided in to two groups, that is, Group I (3-3.1 yrs) and Group II (4-4.1 yrs). Fifteen children with repaired cleft palate and fifteen typically developing children were included in each group. Hundred words from Telugu test of articulation and phonology (D. Vasantha, 1990) were used. Pictorial presentations of the words were presented one by one to all subjects. The samples were transcribed and then analyzed for percent of consonants correct, phonological processes and “compensatory” articulation patterns.

Results & Discussion: A comparison between the groups indicated that although the children with cleft palate exhibited more errors overall, they were similar to their non cleft peers in their phonological processes usage with few exceptions. Additionally, few “compensatory” articulations were noted in the speech of these children.

Conclusions: The findings reveal that the phonological disorder in children with repaired cleft palate has characteristics of both delay and deviance. The

phonological processes reported are helpful to identify those patterns that might serve to differentiate children that need intervention from those who can catch up on their own by the end of the preschool years.

Key words: Phonetic development, phonologic development, age of surgery , compensatory articulation errors

Introduction

Children with cleft lip and palate frequently demonstrate speech and resonance disorders following primary surgical repair of the palatal cleft. Although factors such as postsurgical velopharyngeal insufficiency, poor dental or occlusal status, and developmental delay for many of the problems observed in these children, age at the time of primary palatal surgery is often considered one of the most important factors affecting speech development.

The relationship between age at the time of palatal surgery and speech proficiency for children with cleft palate has been examined by many investigators (Jolleyss, 1954, Lindsay et al., 1962 ; McWilliams, Morris,1978; Dorf and Curtin, 1982,1990; O’Gara and Longemann,1988). In spite of method differences, the findings of most studies are fairly consistent and suggest that children who receive

early palatal repair demonstrate better overall speech than their peers who receive surgery at a later age (McWilliams, et al., 1990). There is also evidence to suggest that children who receive late palatal surgery are at greater risk for developing atypical patterns (Dorf and Curtain, 1982, 1990; O’Gara and Longemann, 1988).

The atypical patterns of articulation noted in children with cleft palate have been previously described by other authors (T Rost, 1981; McWilliams, et al., 1990) and include glottal stops, pharyngeal stops or fricatives, velar stops or fricatives, posterior nasal fricatives, and mid-dorsum palatal stops. Early palatal surgery is often recommended to circumvent the development of these “compensatory” articulation patterns.

Recent studies have documented the presence of language deficits in addition to speech impairments, particularly at the beginning of language acquisition (Broen et al., 1998; Chapman et al., in press; Estrem & Broen, 1989; Scherer, et al., submitted). Specifically, young children with clefts exhibit limited sound inventories and small vocabularies when compared to typically developing children of the same age (Broen, et al., 1998; Chapman, et al., in press; Estrem & Broen, 1989; Scherer, et al., submitted).

Chapman (1993) evaluated phonological processes in children with cleft palate at three, four, and five years of age. The children with clefts produced significantly more phonological processes than the noncleft children at three and four years of age, which indicates that children with cleft palate usually produce common phonological processes and produce them for a longer period of time than typically developing children (Chapman, 1993). Research has not specifically evaluated language development at the preschool age; however, based on findings that show speech and language development to be commensurate before the preschool age suggests that children with clefts, as a group, are behind their peers in speech and language when they enter preschool.

Need for the Study

Due to limited studies in Indian languages the present study is aimed to study the percent of consonants correct, type and frequency of phonological processes and the “compensatory” articulation patterns occurring in Telugu speaking cleft palate children.

Phonological development in typically developing children has been studied in various Indian languages. Phonological processes have been studied in typically developing Telugu speaking children from 2-to 3-years of age (Vijaya, 2005) and

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from 3- to 5-years of age (Srilakshmi, 2005). These studies have documented a decrease in syllable structure processes with age and increased number of substitution processes until the age of five years. A total of 18 phonological processes were identified in children until the age of five years. Examination of the types of processes showed that although there are universal tendencies in children phonological acquisition, language specific features play an important role in determining the phonological development of the children of a given language.

Objectives of the Study

- □ To analyze the speech of children with cleft palate and typically developing children using percent of consonant correct.
- □ To study the type and frequency of phonological processes in the productions of children with cleft palate and typically developing children in the age range of 3-5 years.

Method

Participants

Sixty children served as the subjects for the present study. They were taken from age range of 3-5 years The subjects were divided into two groups as group – 1 (3-

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3.11 years) and group – 2 (4- 4.11 years) based on their age. In group- 1, 30 (15 cleft and 15 noncleft children) in age range 3 to 3.11 years were taken. In group -2 ,15 were cleft children and 15 were non cleft children of age range 4 to 4.11 years .Subjects for noncleft were taken from kindergarten and preschools for this investigation.

Subjects for cleft palate were taken from a cleft Rehabilitation Centre situated in Hyderabad. All subjects are Telugu speaking children .They were having no history of congenital anomalies, neurological impairment, sensorineural hearing impairment or intellectual deficits. No restrictions in subject selection were made on the basis of surgical management except palatal surgery be performed prior to testing. Socioeconomic status variable was controlled as far as possible. Children having adequate language were included in this study. The mean age for 1st palatal surgery was 12.3 in Group I with a range from 11months to 13months 11 days and was 12.4 in Group II with a range from 11months to 13months 11days. The mean age for 2nd palatal surgery was 16.5 for Group I with a range from 16 months 2days to 17 months 7 days and mean age for Group II was 16.8, with a range from 16 months 4 days to 17 months 14 days. All children participated in study were administered REELS scale to obtain Language age. All children were able to produce at least two – word combinations in their spontaneous speech at the time of testing.

Stimuli

The Telugu Test of articulation and phonology (TTAP) developed by Vasanta.D (1990) was used as a tool for this study. The test consists of 100 words which were picturised for the purpose of this study. However, a few non-picturable items

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(around six words) were also used for the study. The words are classified into categories like stops, affricates, fricatives, laterals/trills, semivowels and clusters. The test items such as ‘/sp:nu/, /brassu/, etc. which were commonly used in day to day conversation of native speakers of Telugu were also included .

Recording Procedures

For eliciting the response, picture cards, real objects and toys were used. To get acquainted with the children and build rapport before testing, the clinician had an informal interaction with all the subjects to obtain a spontaneous speech sample. All the subjects were individually tested. The target words were elicited by the examiner by showing the picture to the child and asking “what is this?” In instances where spontaneous utterances could not be elicited, questions were asked related to the item to which the target word is expected to be answered. If still the child failed to give the target word, imitation task was used. An interview was conducted along with the parents to obtain the case history information. The responses were recorded on a Samsung tape-recorder with unidirectional microphone.

Analysis Procedure

All samples were transcribed using broad transcription and using Edward Klein’s rules with certain modifications. Similar processes were combined such as palatal fronting and velar fronting to fronting, initial voicing and final devoicing as voicing glottal replacement and backing to velars as backing. Data for each age group was analyzed separately. The mean percentage of occurrence for each phonological process was computed by dividing the total number of opportunities for the occurrence of the process .A significant percentage scale of Hodson’s

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(1990) criteria was taken to identify the significance of the percentage of the phonological processes was as i)high significance : 25- 50 %, ii)significance :24- 50%,iii) less significance : 9- 0 %. The use of idiosyncratic processes was noted.

Results and Discussion

The first analysis compared the size of the consonant inventories for the two groups of children.

S.N O.	GROUPS		% of consonants correct
1.	Group-I	CLEFT	60%
	3-3.11Yrs	NONCLEFT	90%
2.	Group-II	CLEFT	82.1%
	4-4.11 Yrs	NONCLEFT	92%

As seen in the above Table I, it was found that in Group –I ,there was significant difference on the size in consonant inventory , while in Group –II , there was no significant difference in patterns. The possible reason for this difference could be as children begin to overcome their phonetic deviance and expand their phonetic repertoire, they tend to acquire more normal phonetic inventories for speech.

The second analysis compared the cleft and noncleft children use of the various phonological processes. To obtain the percentage of occurrence of phonological processes Hodson’s criteria (1990) was used.

Table II : A Sample of all the Phonological process in cleft palate children.

S.NO.	PHONOLOGICAL PROCESS	EXAMPLE	Percentage of occurrence of Phonological Processes in Cleft Childern (3-3.11Years)	Percentage of occurrence of Phonological Processes in Cleft Childern (4-4.11Years)
1.	Degemination	/duwwena/→/duwene/	30 %	30%
2.	Initial consonant deletion	/gadiyaram/→/adiyaram/	40%	45%

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3.	Cluster reduction	/sku:taru/→/kutaru/	40%	43%
4.	Affrication	/pustakamu/→/puccakum/	45%	35%
5.	Final vowel deletion	/gla:su/→/glaš/	25%	20%
6.	Stridency deletion	/sabbu/ → /tabbu/	46%	40%
7.	Palatal fronting	/ša:ppu/→/sappu/	44%	30%
8.	Velar fronting	/kukka/→/tutta/	44%	35%
9.	Deaffrication	/cakramu/ → /ɟakramu/	35%	30%
10.	Lateralization	/kattera/→/kattela/	35%	30%
11.	Word final devoicing	/e:nugu/→/e:nuku/	37%	25%
12.	Gliding	/uya:la/→ /uya:ya/	45%	40%
13.	Nasal assimilation	/ganta/→/ganna/	40%	41%

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14.	Deaspiration	/janda/→/janda/	40%	35%
15.	Stopping	/a:fi:su/→/a:fi:tu/	40%	40%
16.	Fricativization	/kurci/→/kursi/	40%	45%
17.	Final syllable deletion	/suriyudu/→/suriyu/	45%	45%
18.	Devoicing of stops	/bassu/→/passu/	30%	25%
19.	Metathesis	/pustakam/ → /pukatam/	35%	30%
20.	Denasalization	/nimma/→/dimma/	40%	35%
21.	Glotalization	/ko:ti/→/ko?/	40%	40%
22.	Medial consonant	/dra:ksha/→/dra:sha/	46%	40%

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	deletion			
23.	Backing	/re:diyo/→/ladiyo/	40%	30%
24.	Palatalization	/brassu/ → /bra ʃ ʃ u/	45%	40%

The highly significant phonological processes that can be observed from the table in the cleft group were gliding, initial consonant deletion, cluster reduction, palatalization, denasalization, glotalization, backing, deaspiration, final syllable deletion, affrication, fronting, deaffrication, glotalization, nasal assimilation, stridency deletion, stopping, fricativization, Devoicing of stops, Word final devoicing, Backing .

The phonological processes that were less significantly occurring in the cleft group were final vowel deletion, lateralization devoicing of stops, word final devoicing, degemination, and deaffrication.

The frequent usage of processes such as stopping and stridency deletion was likely related to high pressure requirements for fricative and affricate production. The

explanation for the increased frequency of occurrence of deaffrication among the cleft palate 3-year olds is based on developmental considerations and or ease of production. The child exhibiting difficulty with affricate production would reduce an affricate to a stop.

A more posterior articulation is a common error in cleft palate children as reported by Peterson-Falzone, et al. in 2001. Backing was the only processes that reached productive status in the speech of a child from the cleft group, but not the noncleft group. Backing occurred when a child produced a sound with a more backward place of articulation. For a child with cleft palate, the use of this process is usually associated with efforts by the child to compensate for a velopharyngeal mechanism. Backing has been noticed in the speech of phonologically impaired children and less frequently in the speech of normally developing children, this is supported by the study done by Stoel-Gummon and Dunn in 1985.

The majority of the subjects in the cleft group demonstrated compensatory errors were analyzed as either glottal stops, mid-dorsum palatal stops, or both. Other compensatory patterns of articulation that have been associated with velopharyngeal insufficiency like pharyngeal fricative were noted. The large number of compensatory errors produced by the cleft palate children in this study

included mid-dorsum palatal stops. These findings would appear to have implications for the interpretation of past and future research.

Dorf and Curtin (1990) reported that 90% of their cleft subjects who received palatal surgery between 12 and 37 months of age demonstrated compensatory articulation patterns. So, it is important that the information regarding the type and frequency of the compensatory articulation patterns be provided when attempts are made to characterize the speech of children who undergo late palatoplasty. Without such information, it is not possible to full describe or appreciate the impact of surgery on speech production.

Conclusion

The results of this study suggest a complex relationship between the age of surgery, onset of meaningful speech, phonologic development, and the acquisition of compensatory articulation patterns for children with cleft palate. Although all children has surgery after the onset of meaningful speech there was considerable individual variation in the children's overall speech proficiency. So, further future research is warranted to examine the development of compensatory patters and factors associated with them for a better surgical speech management.

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