

Articulation Defects in Cleft Palate Cases

Rama Pandit* Abrol, B. M.** Srinivas, P. S.***

Introduction

A considerable amount of research has been done on cleft palate speech, particularly on articulation. It is also said that there is an increase in the incidence of cleft palate (Westlake, 1966). It might be possible that many cleft palate babies escaped attention in past and probably the partial clefts were overlooked. More facilities are available now, in terms of early detection and treatment in the new born babies. Infant mortality in the cleft palate population was greater in the past because of nutritional problems and failure to survive after surgery.

Early onset of speech therapy would help to a greater extent in the proper rehabilitation and acquisition of normal speech patterns. This work requires a team approach on the part of plastic surgeons otolaryngologists, dentists, prosthetists, so that a speech pathologist can plan the therapeutic procedures accordingly. The problems of this deformity vary in nature in individual cases. There are also differences in the use of test materials as well as groups studied. Therefore, the results of each study may vary to a greater extent.

The main purpose of this study was to find out the nature of articulatory errors in a total of 56 cases of cleft palate attending the Rehabilitation Unit in Audiology and Speech Pathology, All India Institute of Medical Sciences, New Delhi.

Methodology

The subjects for this study included 56 cases of cleft palate, 33 boys and 23 girls. All these cases were submitted to detailed examination and investigations by the otolaryngologist, dentists, prosthetists, paediatric/plastic surgeon etc. after recording the complete history on a proforma specially prepared for this purpose. An articulation test was used to know the types of errors in terms of substitution, distortion and omissions. An attempt was also made to note the possible aetiological factors, the kind of surgery done and the age at which the cases were operated first on lip and/or palate.

Observations and Results

The incidence of cleft palate was 3% out of the total number of cases of speech and hearing defects. It is also seen from the table 1, that 58.83% were male and

*Speech Pathologist.

**Officer Incharge.

***Speech Therapist.

Rehabilitation Unit in Audiology & Speech Pathology, All India Institute of Medical Sciences, Ansari Nagar New Delhi-110016,

Table 1—Age and Sex Distribution

S. No.	Age groups (in years)	Male	%	Female	%	Total	%
1.	Below 5	10	18.6	6	10.74	16	28.8
2.	5—9	7	12.66	6	10.74	13	23.4
4.	10—14	9	15.25	5	8.95	14	24.2
5.	15—19	2	3.66	6	10.74	8	14.4
6.	20 and above	5	9.20	0	0	5	9.2
Total .		33	58.83	23	41.17	56	100

More than 75% of the cases were below the age of 14 years.

41.17% female out of 56 cases. The male cleft palate cases were more than female. The highest incidence was 28.8% below age of the 5 years.

It was difficult to establish any causative factor, as only a few parents could give the relevant history. There were as many as 52 parents who could not offer reliable history.

of toxic drugs during the first trimester of pregnancy could be obtained.

Many studies are available in the literature about the incidence of hearing loss in cleft palate children. The present study indicates that 29% of cleft palate cases had hearing loss. The average loss in one ear was about 34 dB. and in the other ear about 26 dB. The range of degree of hearing loss varied from 25 dB to 38 dB. This shows that the cleft palate cases might have mild to moderate degree of hearing loss.

Table-2

Possible Aetiological Factors

S. No.	Factors	No. of cases	%
1.	Bleeding in 1st trimester of pregnancy.	2	3.6
2.	Use of Toxic drugs during 1st trimester of pregnancy.	2	3.6
3.	Unknown factors	52	92.8
Total :		56	100

Only in 4 cases history of bleeding or use

Table-3

Incidence of Degree of hearing loss in Cleft Palate

S. No.	Degree of hearing loss in dB	Right	Left
1.	10 — 19	—	2
2.	20 — 29	4	7
3.	30 — 39	7	6
4.	40 — 49	4	—
5.	50 — 59	1	—
6.	Above 60	—	1
7.	No hearing loss	40	40

An efficient surgery at a proper time would make the rehabilitative procedure easier. The speech pathologist must evaluate the characteristics of speech of these cases before and after surgery.

Table 4—Operative Procedures and Prosthetics

S. No.	Operation	Number
1.	Palate	19
2.	Palate and Lip	16
3.	Lip only	1
4.	Lip and palate surgery with prosthesis	2
5.	Lip and palate surgery and pharyngoplasty	2
6.	Lip and palate surgery and pharyngoplasty with prosthesis	3
7.	Palate surgery and pharyngoplasty	2
8.	Pharyngoplasty	1

Table 5—Age at the First Surgery on Lip and Palate

Sr. No	Age Group	Lip	Palate
1.	Below 6 months	5	0
2.	6—12 months	9	1
3.	12—18 months	4	2
4.	18—24 months	—	3
5.	25—60 months	3	25
6.	Above 5 years.	2	13

Out of 46 cases, about 42% had undergone surgery on the palate only. 35% of the cases underwent surgery both for the lip and palate. There was only one case of lip surgery alone. 21.7% of the cases had undergone other treatment and surgery apart

from lip and palate, as indicated in the table 4.

Table 5 indicates that many cases did not undergo suitable treatment at an early age. Table 6 shows the order of the types of articulation errors in cleft palate cases.

It indicates the frequency of substitutions, distortions and omissions for different sound groups. A case who substitutes for velar sound may also distort fricatives etc. Velar sounds are mostly substituted and the fricatives distorted. Distortions were greater in fricatives and sibilants than palatals, retroflex and labial sounds. The distortions were more common than substitution and omissions. Hence, the speech of the cleft palate is mostly distorted than being substituted.

Table 6—The Order of the Types of Articulation Errors of Sound Group in Cleft Palate

S. No.	Sound groups	Substitution	Distortion	Omission	Total
1.	Velar	23	9	4	36
2.	Palatals	6	17	2	25
3.	Dentals	11	9	2	22
4.	Retroflex	12	12	3	27
5.	Labials	5	7	1	13
6.	Thrills	4	7	1	12
7.	Laterals	1	4	—	5
8.	Sibilants	6	21	2	29
9.	Fricatives	6	20	—	26
10.	Aspirates only	5	1	—	6
11.	Non aspirates only	1	—	—	1
Total :		80	107	15	202

Most defective groups in order of

sequence were velars, sibilants, retroflex, fricatives, palatals, dentals, labials and thrills. Aspirates and laterals were found to be the least defective group.

Discussion :

Males were offered more commonly than females. This is in accordance with the findings of Westlake (1966). There were many cases who came for treatment very late as well as for speech correction. It might be due to late recognition by the parents or they might not have been aware of the facilities available.

Many parents could not give relevant history that made it difficult to establish either exogenous or endogenous cause of the defect. It has been said that well being of mothers, during first trimester of pregnancy is important as it is a period when aural structures are formed. Accidents, illness, nutrition, maternal age, vaginal bleeding, menstrual history, types of medication taken were among the items considered. None of these studies really explain why this deformity occurs. Warkan's (1958) research on pregnant rats indicated vitamin deficiency as a cause. In the present study, the bleeding and use of toxic drugs during first trimester of pregnancy were the only known probable factors in 4 patients, two in each group, which could have contributed to the aetiology.

Gannon (1950) from a study of 50 cleft palate children has reported that 66% had no loss (0-10 dB), 18% had slight loss (10-20 dB), 12% had a moderate loss (20-30 dB) and 4% had marked loss

(more than 30 dB). Halfond (1952) described his deficient groups as having mild to moderate involvements. Sataloff et al (1952) who defined hearing loss as a loss of 15 dB or more usually bilateral for over 90% of series of cleft palate children. MacCollum et al (1956) found 19% of 164 subjects had losses averaging 20 dB. Berry (1956) stated that fewer than 60% of 383 cleft palate children had 'recognisable' hearing handicaps. Miller (1956) reported that 54% of 35 cleft palate subjects, aged 30 to 23 years had a loss of 30 dB or more. Skolnik (1958) observed auditory impairment in 39% of the cases. The present study showed the incidence to be 29% while 71% had no hearing loss. This is in conformity with the studies of Gannon (1950), whereas other studies indicate higher incidence, but the degree of hearing loss correlates with all studies and also the losses were mostly bilateral in nature.

The delay in the management would make the patient to develop undesired speech patterns and deviant speech behaviour which would require more time to correct at later stages and are difficult to correct. Most investigators also have evaluated speech status in relation to the early management. The findings are relatively consistent and indicate that a higher percentage of normal speech is associated with earlier age of operation. Holdsworth et al (1954) and Jolleys (1954) found that 47% of the children managed before 2 years of age and only 20% of those managed after this age, had normal speech. Lindsay et al (1962) reported that 70.70% of those managed between

1-3 years and 60% for those managed later developed normal speech. The present study included cases mainly which were managed late i.e., above 2 years.

It is generally agreed (Eckelmann and Balridge (1945); Van Riper, (1963); Van Riper, and Irwin (1958) that one of the major speech problems exhibited by individuals with clefts is a deficiency in articulating speech sound. There are variations in each study conducted on articulation of cleft palate cases. In addition, classification of types of articulatory errors observed are also varied (Spristerbach, 1968). Consonant which require more pressure and more precise channeling are more affected. Cleft palate speakers have maximum difficulty with plosives and fricatives and least with nasals (Westlake, 1966). The present study also revealed that aspirates are less defective than fricatives. It was also seen in the study of Counihan (1960) who concluded that consonants produced by tongue tip complex sounds and back of tongue sounds are more frequently defective than lip or tongue tip simple consonants. Laterals also are found to be least defective.

The factor of age initiation of treatment appears to be of major importance in studying error types. Cleft palate errors are also not so easily labelled as ordinary articulation errors (Westlake, 1966), Counihan (1956) and Mc-Williams (1956) who studied adolescent and adult cleft palate subjects. They reported higher percentage of distortions than

those reported for younger age groups. It is also found from this study that fricatives and sibilants are mostly distorted.

Summary

The present study was conducted on 56 cases of cleft palate and/or lip attending the Rehabilitation Unit in Audiology and Speech Pathology, All India Institute of Medical Sciences, New Delhi. Cleft palate was found to be more prevalent in males than females. 75% of the cases were below the age of 14 years. Only a few parents could give relevant history. It was, therefore, difficult to establish and generalise the causative factors. 29% of the cleft palate cases had mild to moderate degree of hearing loss. About 42% of the cases had undergone palate surgery and 35% both the lip and palate surgery. Many cases reported late for surgical treatment. Velar sounds among all the consonants were found to be substituted most and fricatives were distorted. Distortion was the most common defective articulatory pattern in the cleft palate cases while omissions were least affected. There has been numerous investigations designed to describe the speech articulation on cleft palate. The studies vary in terms of subjects used and the methods of assessment. Yet there is a general agreement on this problem. Plosives, fricatives and consonants which require building up of maximum oral pressure are the most affected sounds in cleft palate speech.

REFERENCES

1. Berry & Eisenson : "Speech Disorders" : New York : Appletton Century—Crofts : 324, 1956.
2. Counihan, D. T. : Articulation skills of adolescents and adults with cleft palates. *J. Speech Hearing Dis.*, 25 : 181, 1960.
3. Ecklemann, D. & Baldrige, P. : Speech Training for the child with a cleft palate, *J. Speech Hearing Dis.*, 1, 104, 1945.
4. Cannon, J. : A study of the effect of certain surgical variables on the auditory acuity of fifty cleft palate children : Washington. 1950, M. A. Thesis : Cited by Spriesterbach (1968).
5. Halfond, M. M. and Ballenger, J. H. : An audiologic and Otorhinologic study of cleft lip and cleft palate cases. *Arch. Otolaryng.*, 64 : 58, 1956.
6. Holdsworth, W.G. : Early treatment of cleft lip and cleft palate : *Brit. Med. J.*, 1 : 304, 1954.
7. Jolleys, A. : A review of the result of operations on cleft palate with reference to maxillary growth and speech function. *Brit. J. Plastic Surg.*, 7 : 229, 1954.
8. Lindsay, W.K., Le Measurier, A.B. & Farmer, A. W. : A study of the speech results of a large series of cleft palate patients. *Plast. & Reconstr. Surg.*, 29 : 273, 1962.
9. McCollum, D.W., Richardson, S. O., & Swanson, L. T. : Rehabilitation of the cleft Palate patient, *New Engl.*, 254 : 299, 1956.
10. McWilliams, B. J. : Some observations of environmental factors in speech development of children with cleft palate : *Cleft Palate Bull.*, 6, : 4-5, 1956.
11. Miller, M. H. : Hearing losses in cleft palate cases, The incidence, type and significance, *Laryngoscope*, 66 : 1492, 1956.
12. Sataloff, J. and Fraser, M. : Hearing loss in children with cleft palate, *Arch. Otolaryngol.*, 55 : 61, 1962,
13. Skolnik, E. M. : Otologic evaluation in cleft palate patients. *Laryngoscope*, 68 : 1908, 1958.
14. Spriesterbach, D.C., & Sherman D. : Cleft palate and Communication : New York Academic Press, Inc., 1968.
15. Vanriper. C. C. : Speech correction : Principles and methods : 4th Ed. Prentice Hall Englewood Cliffs, New Jersey, 1963.
16. Vanriper, C. C. and Irwin J. V. : "Voice & Articulation" prentice Hall. Englewood Cliffs, New Jersey, 1958.
17. Warkany, J. : "Production of congenital malformations by Dietary measures." *J. of the American Medical Association* CIX VII. 1958.
18. Westlake, H. & Rutherford, D. : "Cleft Palate" Prentice Hall Inc., Englewood Cliffs New Jersey 1966.