THE DEVELOPMENT OF ARTICULATORY SKILLS IN CLEFT PALATE BABIES

Kino Jansonius-Schultheiss

Dept. of Phoniatrics, Academic Medical Center,
Meibergdreef 9, 1105 AZ Amsterdam-Zuidoost, The Netherlands
and Institute of Phonetic Sciences, University of Amsterdam,
Herengracht 338, 1016 CG Amsterdam, The Netherlands

ABSTRACT

A description is given of the speech motor (articulatory) development in 3 cleft palate and 2 normal born infants in the first two years of life. The impact of an articulatory impairment of the child speech upon the verbal reactions by the mother is also discussed.

1. INTRODUCTION

In the research project *'The Influence of an Oral Plate upon Speech Development and Interaction in the First Years of Life of Cleft Palate (CP) Babies'* 12 infants with a complete or isolated cleft palate and 6 normal born babies were studied monthly while interacting with their mothers in a naturalistic, free play situation. Their communicative development (from 0;2-2;0 years of age) was registrated by video recordings of 20 minutes each. Besides that, a larger group of 40 2;0 toddlers (30 CP and 10 normal bornes, including the longitudinal group) was recorded once [1]. It turned out that, within this 2 year old group, the CP children without an oral plate (17) uttered less meaningful words, had a less high M.L.U.(L.) (i.e. mean length of (longest) utterance(s), as measured in morphemes), and were less advanced in the use of specific phonological processes than the CP children with an oral plate (13). In comparison with their normal peers, the CP children established far less phonetic, phonological, and syntactic abilities. Looking at interaction, the mothers of the normal born children facilitated the learning process concerning the articulatory proficiency far more by verbal modelling and imitations than the mothers in the CP group. However, the normal born children imitated less than the CP group of children. In our opinion, 'understandibility' of the child endeavoured the speech learning process in the child. In the present study the question was raised whether the quality of articulatory development, in terms of speech motor milestones and certain distinctive features, had an impact upon the point of time that the so-called *word border* (10 or more varied words within the five minutes speech sample) was reached; as well upon specific strategies in the mother to reinforce specific articulations of the child by imitating or other verbal reaction upon child speech.

2. PROCEDURES

2.1. Subjects

The speech of 5 children (3 CP and 2 normal born infants) in interaction with the mother has been studied so far.

2.2. Transcription

From each twenty minutes speech registration those five minutes in which the child produced most utterances, were selected. The speech of mother and child was transcribed according to specific codes [1]. In that system the infant speech productions are seen as an oral physiological development with specific stages and milestones. These go first from *laryngeal* to *single articulatory speech* movements and from *babbling* to the first *words*. In the case of articulatory movements, the speech output was transcribed in terms of *[+/- anterior, +/- plosive and +/- fricative]*. As *'meaningful'* word we considered first and all those articulatory strings on which the mother responded by imitating or giving an associated verbal response; furthermore when the trained transcribents heard a word, either based upon their knowledge of Cleft Palate speech or interpreted from the video picture.

3. RESULTS

3.1. Speech motor aspects

Looking at the overall picture of speech movements in development over the whole period of two years, the CP children differ remarkably from the normal ones (see Table 1.) They produce far more laryngeal than articulatory movements. The expression of words did not seem to be related to the amount of articulatory productions in the first two years of age.

Table 1. Overview in percentages (%) of laryngeal (la) and all articulatory sounds (ar) including babbling as well as words (w) and imitations (i) within the first two years of life of 3 CP (+Cl) and 2 normal born (-Cl) children (Ch).

Ch	1	2	3	4	5
Cl	+	+	+	-	-
la	60	53	56	25	28
ar	12	42	16	19	39
w	20	1	19	44	23
i	8	4	9	12	10

3.2. Articulatory aspects

As shown in Table 2. the CP children have less anterior and more posterior single articulations. Concerning babbling there is variation in general.

Table. 2. Overview in % of single articulatory (a) and babbling (b) speech movements (anterior, posterior and varied), as well as words (w), in 3 CP (Cl) and 2 normal children (Ch) measured in the period of 0;2 until 2;0 years of age.

Ch	1	2	3	4	5
Cl	+	+	+	-	-
aa	43	50	41	73	68
ap	57	50	59	27	32
ba	44	41	35	58	53
bp	15	14	41	18	20
bv	41	14	41	24	27
w	20	1	19	44	23

In Table 3. all the single articulation movements (tokens), also in babbling, were counted and categorized in types as well as specific features. We focused upon the anterior articulations, especially the plosives and fricatives. The normal born children produced not only more articulatory movements in general, they produced also a larger variation in articulation types, compared with the articulatory production of the CP child analyzed so far (Table 3.). The normal born children produced more anterior articulations in absolute frequency as well as percentages than in one of the CP children, analyzed so far.The speech sounds with the features [+anterior, +fricative or +plosive], have a high frequency in Dutch and should have - in our opinion - an impact upon the expression of the first words, the point of time in which the word border is reached (see also Table 5.)

Table 3. Overview of the total amount of articulations (Na), the number of different articulation types (Nat), anterior plosives (Nap) as well as fricatives (Naf), plus the ratio of anterior plosives and fricatives with other articulations (%) in 1 CP (Cl) and 2 normal children (Ch) (from week 10-77).

Ch	3	4	5
Cl	+	-	-
N a	136	591	1054
N at	14	38	40
N ap	2	193	453
N af	3	14	2
% ant. articul.	2	35	43

Looking at the interaction between mother and child, we wondered how the mother would strengthen the correct articulations by verbal reinforcement of child articulations (Table 4.), which strategy she would use. At this moment only the material of the two normal born children has been analyzed.

Table 4. Overview of maternal reinforcement of child articulations in absolute frequency, total amount of reinforced articulations (Na) and percentages (%); the number of verbally modelled articulation types (Nat), anterior plosives (Nap) as well as frica-tives (Naf), the ratio of anterior plosives and fricatives with other child articulations (%) in the maternal speech material of 2 normal children (Ch) (from week 10-77).

Mothers of normal born children no.	4	5
N ra	174	142
% ra	29	13
N rat	21	22
% rat	55	55
N ap	71	78
N af	5	2
% ant art.	44	56

Both mothers differend in amount in percentages in which they reacted upon the child articulations. They showed however the same tendency in their reactions upon articulation types: they reacted only upon child speech material with those articulation types which are most standard in the Dutch phoneme system. It was a remarkable fact that a high percentage of anterior plosives and fricatives were reinforced and therewith strengthed by the mothers. It looked as if they selected very carefully from all articulatory strings they heard out off the mouth of their child, those articulations which are most important for later word usage. They facilitated therewith the phonetic and phonological learning process.

In that sense the CP child with a less amount of articulations and less varied articulatory ability is not just at risk for speech and languague problems due to its oral physical inability to produce sufficient anterior plosives and fricatives, but due to maternal speech interaction as well.

Remarkable differences between the 3 CP and 2 normal children were also found in onset of the vocabulary spurt, after the point of time of reached word border. The 3 CP children can be considered as delayed. (see Table 5.).

Table 5. Overview of the point in time in weeks (w), on which the word border is reached in 3 CP and 2 normal born children. One child (2) had not reached this border yet at the age of 2;0 years.

Ch	1	2	3	4	5
week	74		80	53	55

4.0 Conclusion

In comparison with normal born children, the cleft lip and palate children can be considered to be at risk for speech disturbances. The laryngeal expressions were more dominantly present than single articulation movements in the forst two years of life. The anterior articulations were less present than the posterior ones in de CP group. The mothers of the two normal born children gave consistently verbal feedback concerning those articulation types the child uttered which belonged to the Dutch phonological system. They had high percentages of articulatory reinforcement of anterior plosives and fricatives as well. Such effects had - in our opinion- an impact upon the point of time in weeks in which the word border was reached. The three CP children were far more delayed than the two normal born ones. This is of clinical importance, implying that speech rehabilitation should start already in the first year of life of cleft palate babies.

5.0. Literature

[1] KOOPMANS-VAN BEINUM, F.J., JANSONIUS-SCHULTHEISS, K. & VAN DER STELT, J.M. (1990), The Influence of an Oral Plate upon the Speech Development and Interaction in the First Years of Life of Cleft Palate Babies, *IFA-report 110*, Institute for Phonetic Sciences, University of Amsterdam, (in Dutch).