A SURVEY OF THE USE OF SPECIAL EQUIPMENT EMPLOYED IN SPEECH CORRECTION FOR THE CEREBRAL PALSIED CHILD

Thesis for the Degree of M. A.

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Betty Louise Hackleman

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This is to certify that the

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A SURVEY OF THE USE OF SPECIAL EQUIPMENT EMPLOYED IN SPEECH CORRECTION FOR THE CEREBRAL PALSIED CHILD

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Presented to

the Faculty of the Department of Speech, Dramatics and Radio Education

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by

Betty Louise Hackleman

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A SURVEY OF THE USE OF SPECIAL EQUIPMENT EMPLOYED IN SPEECH CORRECTION FOR THE CEREBRAL PALSIED CHILD

By

Betty Louise Hackleman

AN ABSTRACT

Submitted to the School of Graduate Studies of Michigan State College of Agriculture and Applied Science in partial fulfillment of the requirements for the degree of

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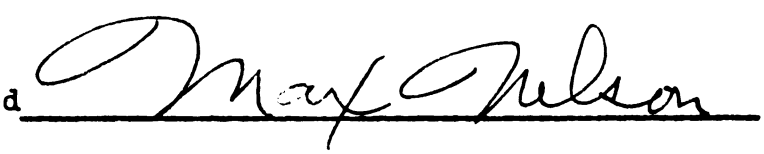
Approved 

The purpose of this study was to correlate the following: 1. Special equipment used in speech improvement for the cerebral palsied child, 2. with the basic speech activities attained, 3. and the type of cerebral palsy for which it was used.

This was a survey type study. The questionnaire was composed of three main areas: 1. basic speech activities, 2. type of cerebral palsy, 3. equipment and its use. The mailing list was compiled from sources suggested by leading authorities in the fields of speech correction and cerebral palsy.

The questionnaire with an accompanying letter of explanation was sent to 105 clinics and individuals who dealt with cerebral palsied children. The results of the questionnaire were as follows: forty-five completed questionnaires comprising 43% return, and twenty-five partial replies comprising 24% return. The total of seventy replies comprised 67% return.

The major findings of the study, which was limited to Spastic, Athetoid and Ataxic types of Cerebral Palsy, have been listed below according to divisions of the questionnaire.

The leading apparatus for breath control was the Bubble jar; for phonation was the Picture box; for tongue control was the Tongue spoon; for opening and closing the mouth was the Bubble jar; for peristaltic movement was the Bottle straw;

for relaxation was the Relaxation chair; for other uses was the Hearing tube. The over-all single leading piece of equipment was the relaxation chair. The two items listed most frequently as additions to the equipment on the questionnaire were the recorder and the audiometer.

The major findings for this study were as follows: 1. The athetoid type cerebral palsy utilized the most special equipment in speech improvement. 2. Breath control was the basic speech activity which most often employed special equipment. 3. The relaxation chair was the apparatus used most often for speech improvement with cerebral palsied children.

Chapter I

BACKGROUND

Chapter I

BACKGROUND

It is the author's contention that while there is an increasing amount of equipment being used in speech therapy with the cerebral palsied child, as yet there appears to be no consistent effective utilization of this equipment. The end result of the survey was to determine extent of use, as well as the status, of this special equipment.

I. Purpose of the Study

The purpose of this study was to correlate the following:

1. Special equipment used in speech improvement for the cerebral palsied
2. with the basic speech activities attained
3. and the type of cerebral palsy for which it was used.

II. Definition of Terms

Special equipment: Equipment needed to assist in stimulation of responses from within a person. This equipment, in general, is not used in correction with the non-cerebral palsied individual.

Therapy: Training, exercises or other management of a case designed and intended to bring some abnormal condition

closer to normal.[1]

Speech handicap: "Speech is defective when it deviates so far from the speech of other people that it calls attention to itself, interferes with communication, or causes its possessor to be maladjusted."[2]

Normal: In this paper the term normal refers to individuals not handicapped by cerebral palsy.

III. Introduction

Cerebral palsy is a problem of great magnitude. "According to Dr. Phelps' survey in 1946 the over-all incidence or range of occurrence of cerebral palsy was 7 per 100,000 of the general population, or one in every 215 births. Recent surveys suggest that there are one-half million cases in the United States over six years of age."[3] For many years cerebral palsy was shrouded with mystery. The physical appearance of the child, facial grimace, drooling, writhing arms, lumbering gait, gave rise to the belief that these children were of abnormal intelligence. However, there has been a great deal of work done in the field in recent years

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1. Robert West, Lou Kennedy, Anna Carr, Rehabilitation of Speech (New York and London, Harper & Brothers, Publishers, 1947), p. 633.

2. Charles Van Riper, Speech Correction: Principles and Methods (New York, Prentice-Hall, Inc., 1950), p. 15.

3. William J. Miller, "Cerebral Palsy: A Review, 1952", The Crippled Child, Vol. 20 (February, 1952), p. 18.

which proves that the cerebral palsied child, for the most part, was not mentally deficient. "Careful studies of the intelligence of cerebral-palsied children place approximately 30 per cent in the feeble-minded group and 5 per cent in the superior group, the remaining 65 per cent falling within the range of normal intelligence."[4] A discussion of the physiological involvement is desirable not only from the educational but definitional standpoint.

IV. Medical Phase

One definition of cerebral palsy that was quite concise was that of Perlstein who says, "Cerebral palsy is any involvement of motor function, such as paralysis, weakness, in-coordination, involuntary motions or any aberration of motion due to involvement of motor centers of the brain."[5] The authorities agree that the leading causes of cerebral palsy are considered to be mechanical injury to the brain at birth, hemorrhage of the brain, premature birth, disease or injury of the pregnant mother, deprivation of oxygen, the mal-development of the brain, heredity and blood incompatibility.

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4. West, Kennedy, Carr, op. cit., p. 430.

5. Wendell Johnson, Speech Problems of Children (New York, Grune & Stratton, 1950), p. 164.

Previously all cerebral palsied children were classed as "spastic". In more recent years it has been found that spasticity was only one of several types of cerebral palsy. Each type was distinctly different in its outward manifestations and also location of the brain lesion. Therefore, because of these different behaviorisms, it was necessary to have a differential diagnoses.

Pohl, an orthopedic surgeon, classifies cerebral palsy into six types: spastic, athetoid, ataxic, rigidity, tremor and atonic.[6] Following will be a brief discussion of each type according to outward manifestations, location of lesion, and percentage of the incidence in total number of cerebral palsy cases.[7]

1. Spastic type . . . is due to "simultaneous contraction of antagonistic or reciprocal muscle groups accompanied by hypertension or hypertonicity."[8] The muscles are too tense and there is difficulty in obtaining relaxation. For example, the spastic who attempts to reach for an article might suddenly flay himself in the chest because

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6. John F. Pohl, Cerebral Palsy (Saint Paul, Minnesota, Bruce Publishing Company, 1950), p. 5.

7. The reference for location of lesion and the total number or percentage of each type of cerebral palsy will be Pohl, vide supra.

8. Van Riper, op. cit., p. 406.

of sudden involuntary contractions of the antagonistic muscle groups. "The lesion in the spastic type lies in the motor cortex, a specialized area of the surface layer of the brain lying just in front of the central fissure (fissure of Rolando)." The spastic type cerebral palsy accounts for 66 per cent of the total incidence.

2. Athetoid type . . . is characterized by constantly recurring random movements, one involuntary contraction after another. These movements may be rhythmical, large or small, rapid or slow. They may affect any part of the body. Often the movements disappear when the individual is asleep. Athetosis is divided into two classes; the athetoid and the tension athetoid. The latter is similar to spasticity and is caused by the individual tensing the muscles in an effort to control the random movement.[9] An athetoid child starts to reach for an article but instead of a direct motion he weaves his arms in random movement before finally attaining his goal. "The lesion in the athetotic type lies in the basal ganglia, motor centers deep in the brain which ordinarily control associated and automatic

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9. Van Riper, op. cit., p. 407.

movements and play an important part in regulation and maintenance of body posture." Athetosis is considered to be the second most prevelant type of cerebral palsy having an incidence of 19 per cent of the total cases.

3. Ataxic type . . . shows a lack of equilibrium. It is difficult for them to maintain balance as in walking a straight line. The ataxic displays a large amount of motor incoordination because of the lack of automatic equilibrium. "The lesion is in the cerebellum and the incidence is 8 per cent."
4. Rigidity type . . . displays extreme stiffness. The muscles have a plastic hypertonicity. "Rigidity is apparently due to widespread brain damage and is usually associated with severe mental deficiency. These cases make up 4 per cent of the total."
5. Tremor type . . . marked by constant involuntary vibrating movements which are regular and rhythmic. "This tremor is usually slow and is most evident when the patient attempts physical activity such as walking. Tremor type of cerebral palsy accounts for 2 per cent of the total."
6. Atonic type . . . a marked flaccidity of the muscle is present. There is a marked disinclination for

voluntary movement. "The lesion is believed to be in the pre-motor area of the brain. These cases are quite rare."

It should be remembered that there can be a combination of types and difficulty in diagnosing according to one specific type. It is possible for a patient to have as many as five different diagnoses.

From this discussion it can be seen that the three types, spastic, athetoid, and ataxic, comprise the majority of the cerebral palsy cases, having a total of 93 per cent. This study will then be limited to these three types.

Cerebral palsy may be also classified according to body involvement. Paraplegia designates the involvement of two limbs, for example both arms or both legs. Hemiplegia refers to involvement of one side of the body, for example one arm and leg. Quadraplegia indicates involvement of the entire body or all four limbs.

Dr. Bronson Crothers[10] indicates that there are three important facts to be kept in mind when working with the cerebral palsied child: 1. The lesion will not increase in size or change in character so that the disturbances will not change for the worse. However, it should be remembered that

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10. As quoted by Wendell Johnson, op. cit., p. 171.

tissues are replaced to a very small extent and nerve cells are never replaced. So while the damage will not increase neither will it decrease. 2. The lesion is likely to be diffuse rather than localized. This factor accounts for the difficulty in diagnoses of cases and occurrence of symptons of several types of cerebral palsy. The lack of localization causes confusion in the physiological disturbance. 3. The damage is on a growing organism. Although the injury occurred in earlier life, the influence of the static lesion on a growing organism and the developing behavior patterns comprise the basic problem for therapy.

V. Educative Phase

Since the cerebral palsied child may be a victim of multiple handicaps and might be so severely handicapped physically that he is a permanent cripple, it is of prime importance that every effort possible is given to the acquisition of speech. Huber says, "Comprehension and enjoyment of language come long before meaningful speech is attempted and, unless the handicapped child is strongly motivated to speak he may not put forth the necessary effort."[11] Therefore it becomes necessary to begin speech training with the

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11. Mary Huber, "Letter to the Parents of the Cerebral Palsied Child," Journal of Speech and Hearing Disorders Vol. 15 (1950), p. 155.

cerebral palsied child as early as possible. Because of his handicap the child's speech might be quite unintelligible but he must be encouraged to speak whether he can be understood or not. Huber goes on to say, "In the case of the handicapped child it is effort that must receive recognition rather than the successful accomplishment of any act . . . Any sounds the child makes at any age are likely to be an important phase of his speech development and failure to regard them as such may inhibit further attempts to become a speaking individual."[12]

The term typical spastic speech was difficult to define. Although certain patterns are prevalent among children with cerebral palsy, characteristics of all speech disorders are found in their speech pattern. In Rutherford's study of 48 athetoid and 74 spastics, in comparison with a control group of 69 normal children she has this to say. "In this sampling of the speech of children handicapped by cerebral palsy, there is little evidence to indicate that there is sharply defined type of speech which is peculiarly characteristic of these children. The range of individual differences is wider and there seem to be more extremes in the C. P. group than in the non-C. P. group in all attributes studied . . . But in general, the trends in loudness, pitch, rate, rhythm

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12. Ibid., p. 155.

and quality are the same in the speech of the C. P. group as in the speech of the non-C. P. group . . . In describing the speech of these children, then the term characteristic spastic speech should be avoided."[13] There are additional outward anomolies which characterize the C. P. child. These include drooling, clumsy, awkward movements with a thick tongue, or frowns, squints and grimaces.

"Before therapy can begin, a complete diagnostic physical examination should be given the child to determine the nature of the motor difficulty."[14] Although certain therapists do not believe that the type of cerebral palsy indicates a different approach to speech therapy the literature indicates that there is a vast difference in speech involvements in the different kinds of cerebral palsy. Pusitz, a neuromuscular specialist, further brings out the need for a differential diagnoses thusly:

> It is not only important in the general treatment but particularly so in speech correction. It is essential to distinguish between pypertonia of muscles and hypotonia i. e. too much or too little tone. In

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13. Berniece R. Rutherford, "A Comparative Study of Loudness, Pitch, Rate, Rhythm and Quality of Children Handicapped by Cerebral Palsy," Journal of Speech Disorders, Vol. 9 (1944), p. 270.

14. M. A. Perlstein, and Marie Shere, "Speech Therapy for Children with Cerebral Palsy," American Journal of Diseases of Children, Vol. 72 (October, 1946), p. 389.

> the former, bracing is contraindicated, where-as in the latter it is very much indicated. Developmental cases give a very poor prognosis, and usually comprise the unintelligent group. In the cortical or true spastic type, the prognosis is much better, and repetitive methods are of great value in this type. In athetoid cases, however, the prognosis is not so good, and repetitive methods are of no great value. It is essential to induce relaxation before any worthwhile progress can be made. In cerebellar cases, and in fact all types, it is very essential that the sensory education precede the motor . . . In true spasticity the defect is rather uniform, and the type of speech utilized by truly spastic subjects can be learned easily by those who work with them to any extent . . . In the athetoid patient, where involuntary motion is the primary difficulty, speech is upset by the involuntary athetoid movements of; for example, the tongue, and since these involuntary motions never coincide with the voluntary ones made by the patient when he speaks, the words never come out distorted the same way . . . Cerebellar speech is an ataxic speech. It is an explosive, hesitant type of speech, scanning in character, with stretching of syllables which are sharply cut off from one another. In this type of speech it is important to correlate proprioceptive impulses with definite motor movements.[15]

Further differentiation of speech difficulties between the spastic and athetoid is given by Rutherford:

> The C. P. extrapramidial (athetotic) group seems to tend toward slower more jerky speech than the C. P. pyramidial (spastic) group. In the C. P. extrapyramidial group there are also more loud voices, more low pitched voices and more monotonous or breathy voices.
>
> The difference between the two C. P. groups in breath control and in mobility of speech musculature suggests that a difference in the therapy for the cerebral palsy ex. and cerebral palsy p. groups is indicated.

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15. M. E. Pusitz, "Speech Correction in Cerebral Palsies: From Standpoint of a Neuromuscular Specialist," Journal of Speech Disorders, Vol. 4 (1939), p. 210.

> Differential diagnosis, physiologically and anatomically is indicated as the bases for initial screening. Further tests of individual abilities within each C. P. group should disclose individual needs. Differential therapy will then be based on these needs."[16]

One of the basic differences in the two types of cerebral palsy, spastic and athetoid, is in their breathing patterns. The spastic often displays what has been termed "reverse breathing" pattern. This is a "thoracic and abdominal opposition which occurs during both silent and speech breathing. The athetoid tension might have the 'reverse breathing pattern' but more often their breathing follows no predictable pattern."[17]

The therapy program for the cerebral palsied child, as has been stated previously, should be started quite early. The parents can encourage his babbling at home. Also if a good nursing pattern can be established it helps immeasurably in acquisition of good speech patterns. Westlake states that there are three major phases to the cerebral palsy speech program; "1. Physiological readiness for speech, 2. Psychological and social readiness for speech, 3. Direct training of

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16. Berniece R. Rutherford, "Frequency of Articulation Substitutions in Children Handicapped by Cerebral Palsy," Journal of Speech Disorders, Vol. 4 (1939), p. 285.

17. Henrietta Hull, "A Study of the Respiration of 14 Spastic Paralysis Cases During Silence and Speech," Journal of Speech Disorders, Vol. 14 (1949), p. 276.

speech."[18] The first two steps can be aided by the parents and are quite difficult to establish if the clinician alone has the responsibility.

It is the opinion of various authorities[19] that often the cerebral palsied child is pampered and coddled in his home environment. And because of the unintelligibility of his speech the first steps in speech acquisition often go unrecognized. The interaction of the family unit to the child's first attempts at speech is important to the psychological and social maturity of the child. The parents must encourage these attempts at speech, must show pleasure, must encourage independence. The child's ability to vocalize rather than his intelligibility should be stressed. But he should not be pushed beyond his ability so that it becomes a frustrating situation.

The establishing of the physiological readiness of speech might be the portion of the program requiring the most ingenuity on the part of the therapist. Westlake divides the basic physiological speech activities as follows: "1. Breath control, 2. Phonation, 3. Chewing and closing the mouth, 4. Elevating the tip of the tongue or general tongue control,

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18. Harold Westlake, "A System for Developing Speech with Cerebral Palsied Children," Reprint from The Crippled Child (June, August, October, December, 1951), p. 3.

19. Ibid., p.5.

5. Peristaltic movement, 6. Stabilization."[20] These basic activities which are acquired with nonconscious effort on the part of the normal child might take months, even years to establish in the cerebral palsied child. One cannot merely say to the cerebral palsied child, "To make this sound you must put the tip of your tongue behind your upper front teeth." Nor can you get him to do so by simply showing him in front of a mirror. He understands what is expected of him but his muscles fail to cooperate. It is the training of the muscles to do the conscious bidding of the child which must be established before actual speech work can be accomplished. This is not done easily. The child must thinkingly work on elevating the tongue tip. Perhaps at first it must be raised for him so that he can feel the proper placement. This process might have to be repeated daily for weeks before there is any sign that the muscles can do the work alone. The therapist is drawn upon to devise various methods whereby the muscles might be used properly. In this attempt at establishing proper muscle usage certain pieces of equipment and techniques for application have been devised and are becoming more standard in cerebral palsy training.

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20. Ibid., p. 5.

Chapter II

DESCRIPTION OF PROCEDURE

Chapter II

DESCRIPTION OF PROCEDURE

This was a survey type study. Therefore, a questionnaire was devised to obtain the information desired. This questionnaire had three main areas:

1. Basic speech activities as expressed by Westlake.[21] Example: Breath control, phonation, tongue control, opening and closing mouth, peristaltic movement,[22] and relaxation.

2. Type of cerebral palsy: limited to spastic, athetoid and ataxic since these three types comprise 93% of the total incidence of cerebral palsy.

3. Equipment as taken from a listing in Zeta Tau Alpha equipment manual.[23] Example: Breathing tube, hearing tube, bottle straw, etc.

Each piece of equipment was allotted space so that the use of the equipment could be given. The equipment was to be checked according to use for basic speech activity and type of cerebral palsy with which used.

I. Compilation of Mailing List

The questionnaire, entitled "The Use of Special Equipment in Speech Therapy with Cerebral Palsied Children," was

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21. Ibid., p. 5.

22. Chewing and swallowing process.

23. A Manual of Cerebral Palsy Equipment, (National Society for Crippled Children and Adults, Inc., Chicago, 1950).

sent to 105 clinics and individuals who dealt with cerebral palsied children. The mailing list was compiled from sources suggested by leading authorities in the fields of speech correction and cerebral palsy.

1. The organizations contacted for mailing sources were as follows:
   a. American Speech and Hearing Association
   b. The National Society for Crippled Children and Adults, Inc.
   c. United Cerebral Palsy Associations, Inc.
2. The individuals contacted for mailing sources were as follows:
   a. Mrs. Julliette Gratke, Director, Cerebral Palsy Treatment Center and Speech Center, Dallas, Texas.
   b. Dr. Martin F. Palmer, Director, Institute of Logepedics, Wichita, Kansas.
   c. Dr. Winthrop Phelps, Director, Children's Rehabilitation Institute, Cockeysville, Maryland.
   d. Miss Jayne Shover, Associate Director, National Society for Crippled Children and Adults, Inc., Chicago, Illinois.
   e. Dr. Harold Westlake, Director, Speech and Hearing Clinic, Northwestern University, Evanston, Illinois.

A letter of orientation and explanation of the study accompanied the questionnaire. Two weeks after the mailing

of the questionnaire and accompanying letter, a follow-up post card was sent to those sources failing to answer, requesting a reply by a definite date.

A copy of these three items, questionnaire, accompanying letter and follow-up card will be found in the Appendix, pages 71 through 76.

II. Return of Questionnaire

There were 105 questionnaires mailed. Following is a breakdown of the return of the requested information:

Questionnaires returned answered	45
Questionnaires returned because of incorrect address	7
Questionnaires returned stating there was no speech therapist	4
Letters stating there was no cerebral palsy service at the center	6
Letters stating there was no speech therapist at the center	3
Letters of adverse criticism[24]	3
Letter with information but no questionnaire	1
Letter stating they were unsure of definition of equipment	1
Total	70

The forty-five completed questionnaires comprised 43% return of the 105 mailed. The twenty-five incomplete answers comprise 24%.

The seventy (total) replies comprise a total of 67% return.

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24. The letters of adverse criticism may be found in the Appendix pages 77 and 78.

Chapter III

RESULTS AND DISCUSSION

Chapter III

RESULTS AND DISCUSSION

The data compiled from this study have been recorded in a master chart form. This chart will be found in the Appendix, page 79. The information will be discussed according to the basic speech activities, breath control, phonation, tongue control, opening and closing of mouth, peristaltic movement and relaxation. The segment of the chart pertaining to the activity under consideration was reproduced at the end of each discussion.

I. Breath Control

The basic speech activity of breath control was exercised most frequently with the bubble jar. This piece of equipment was indicated as being used as follows: Sp.[25] 22; Ath. 25; Atax. 16. The use of the equipment for breath control is primarily to increase vital capacity and oral expiration of air. The leading use for the bubble jar was given as blowing bubbles into a glass of water with the aid of a straw. Another use was to have the child transfer

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25. In the study the abbreviations for the types of cerebral palsy will be as follows: sp., spastic; ath., athetoid; atax., ataxic.

a liquid from one jar into another jar by blowing through a straw. Some of the answers indicated that this bubble jar aided in motivating the child since he could see his progress in blowing.

The second most frequently enumerated piece of equipment for breath control was the feather box. This item was used Sp. 19; Ath. 20; Atax. 16. The primary use of this piece of equipment was for nasal control of the air stream. The feather box was also used in articulatory drills to show direction of air stream either nasally or orally. It was further used for motivation and for strengthening exhalation and breath pressure.

The bottle straw was third in frequency. It was used Sp. 11; Ath. 11; Atax. 8. The method used for this piece of equipment is placing the end of a straw into a glass of water and having the child suck or blow.

The fourth device in respect to frequency was the inclined plane. This was listed Sp. 9; Ath. 13; Atax. 5. This apparatus was used only in blowing small items such as ping-pong balls up an inclined plane for better breath control.

The fifth major piece of equipment for breath control was the breathing tube which was checked Sp. 9; Ath. 10; Atax. 6. This was described either as a rubber hose or

straw. The mouthpiece of the tube or straw allows the child to direct the breath stream through the mouth and blow candles, feathers or other small, light items from the table. One person indicated that he used this item in water to blow bubbles.

The clown board was indicated as being used Sp. 7; Ath. 7; Atax. 6. In using this for breath control, rubber tubing is placed through the clown's mouth and attached to a balloon; the child inflates the balloon by blowing into the other end of the tubing.

The relaxation chair was used as follows: Sp. 6; Ath. 6; Atax. 3. The only uses pertaining to breath control for this piece of equipment were: timing the prolongation of phonation, and exercises which stress synchronization of breathing and phonation in speech.

The nursing straw was checked Sp. 4; Ath. 5; Atax. 5.

The abdominal corset was used Sp. 2; Ath. 8; Atax. 0. This piece of equipment was utilized to force the use of upper chest muscles, and to control reverse breathing. One person indicated he had modified the corset with successful results. This modification was a band of elastic six inches wide, boned and laced at the back. It was used in supine, sitting and standing positions for breath control and vocalization drills.

The nursing bottle was used as follows: Sp. 4; Ath. 3;

Atax. 2. No specific use of this apparatus was noted for breath control.

The spirometer was indicated as being used Sp. 3; Ath. 3; Atax. 3. The use given was for breath control and elimination of explosive blowing as well as to enable the child to discriminate visually between sucking and blowing.

The kymograph was used Sp. 3; Ath. 4; Atax. 0. Uses given were: for a diagnostic aid in determining respiratory imbalances; as a motivating devise; and for a visual training aid.

Bean bags were indicated as being used with the following distribution: Sp. 2; Ath. 3; Atax. 1. The only use given for this piece of equipment relative to breath control was the placing of the bag on the abdomen to show the rise and fall with inhalation and exhalation.

The sand bag was checked for use in breath control as follows: Sp. 3; Ath. 3; Atax. 0. Sand bags are used on plinths over abdomen, legs, shoulders, and arms for relaxation, breath control and vocalization.

The chair foot support was indicated for use Sp. 2; Ath. 2; Atax. 2. There was no specific use given.

Tongue-tip straws were used for breath control with this distribution: Sp. 2; Ath. 2; Atax. 1. The specific use

given was indicated that with the mouth open, the child sucks or blows through the straw.

The hearing tube was used Sp. 2; Ath. 2; Atax. 1. This object was a long piece of rubber tubing. At one end was an ear-piece which was inserted into the ear of the child. At the other end was a funnel into which the therapist spoke. No specific utilization was given.

The individual standing table used Sp. 1; Ath. 2; Atax. 1. There was no specific use given.

The following pieces of equipment were checked for breath control only one time for each of the types of cerebral palsy; tongue spoons, clown pictures, standing board, form board, picture box. There was no use given for any of the above pieces of equipment.

The following means were indicated as not being used for breath control with any of the three types of palsy: mandibular sling, mandible stabilizer.

According to this study the five major apparatus used with all three types of cerebral palsy to establish breath control are: bubble jar, feather box, inclined plane, bottle straw and breathing tube. Of the six basic speech activities, breath control is the leading use for the above apparatus.

The spirometer and kymograph were recorded Sp. 3, Ath. 3, Atax. 3, and Sp. 3, Ath. 4, Atax. 0 respectively. Although

these items have a low return in comparison to other items, it is interesting to note that the kymograph is not used for any speech activities other than breath control. The spirometer was indicated no more than one time for any type of cerebral palsy with the other speech activities. This would appear to indicate that these two instruments were most valuable for breath control.

The total use of equipment for breath control for all three types of cerebral palsy was 331. Equipment for breath control was indicated most frequently for the athetoid type cerebral palsy with a total of 134. Second was the spastic type with a total of 116 and the ataxic type was third with a total of 81. This would seem to indicate that the sources contacted for this study found the athetoid type cerebral palsy most in need of help in establishing breath control. The ataxic type was somewhat lower than the other two, suggesting much less trouble with breath control.

A summary of previously discussed material will follow in table form.

TABLE I

BREATH CONTROL
FREQUENCY DISTRIBUTION OF EQUIPMENT

Equipment	Type of Cerebral Palsy		
	Sp.	Ath.	Atax.
Bubble jars	22	25	16
Feather box	19	20	16
Bottle straw	11	11	8
Inclined Plane	9	13	5
Breathing tube	9	10	6
Clown board	7	7	6
Relaxation chair	6	6	3
Nursing straw	4	5	5
Abdominal corset	2	8	0
Nursing bottle	4	3	2
Spirometer	3	3	3
Kymograph	3	4	0
Bean bag	2	3	1
Sand bag	3	3	0
Chair foot support	2	2	2
Tongue-tip straws	2	2	1
Hearing tube	2	2	1
Individual standing table	1	2	1
Tongue spoons	1	1	1
Clown picture	1	1	1
Standing board	1	1	1
Form board	1	1	1
Picture box	1	1	1
Mandibular sling	0	0	0
Mandible stabilizer	0	0	0
	116	134	81

II. Phonation

Phonation was the second of the six basic speech activities listed on the questionnaire in this study. Following is the discussion and results according to the returned questionnaires.

The item indicated as being most frequently used for phonation was the picture box. The returns indicated that it was used Sp. 7; Ath. 10; Atax. 10. The method of utilizing this piece of equipment was listed as using single-colored pictures to contain the sound in initial, medial and final positions. Another use for the picture box was to test for carry-over of previously studied sounds.

The second leading item was the feather box. This item according to this study was indicated for usage as follows: Sp. 6; Ath. 7; Atax. 6. This was used to work with phonation of plosive sounds.

The third leading medium used for phonation was the relaxation chair. The returns according to type of cerebral palsy were: Sp. 5; Ath. 6; Atax. 4. The utilization of this agent was to time prolongation of phonation.

The fourth piece of equipment according to usage is the form board. It was used Sp. 5; Ath. 5; Atax. 5. The uses of this agent were: to provide a tool for articulatory drill; aid in verbalization where there is much "speech conscious-

ness"; to detract attention from speech; as a conversation board for those unable to develop acceptable speech.

Another leading vehicle used for phonation is the hearing tube. It was used as follows: Sp. 5; Ath. 5; Atax. 4. The uses given for this apparatus are; to cut down on extraneous stimuli; increase attention span; and induce stimulation.

The clown picture was the next item according to frequency. The usage was given as Sp. 4; Ath. 6; Atax. 3. The method given for its utilization was auditory discrimination.

The bean bag was the next most frequently used medium. It was used Sp. 5; Ath. 4; Atax. 3. The bean bag was used in this manner: the child throws the bag and says a consonant, as the bag lands he utters a vowel.

The next two pieces of equipment were used the same number of times, Sp. 3; Ath. 3; Atax. 3. The clown board had no specific use given. The individual standing table was used to establish a good position for phonation.

The sand bag is the next leading agent. Its frequency was given as Sp. 3; Ath. 4; Atax. 1. The utilization of the sand bag was in establishing relaxation and obtaining easier vocalization.

The breathing tube was the next most frequently listed piece of equipment used for phonation. It was listed Sp. 2;

Ath. 3; Atax. 2. There was no specific use listed for this basic speech activity.

The mandibular sling was listed Sp. 4; Ath. 2; Atax. 0. There was no specific usage given for phonation.

The following pieces of equipment were listed the same number of times in frequency although the distribution varied. They will therefore be listed according to appearance on the questionnaire.

The nursing straw was indicated as being used for the types of cerebral palsy as follows: Sp. 2; Ath. 2; Atax. 1. No specific use was given for phonation.

The nursing bottle was used as follows: Sp. 2; Ath. 0; Atax. 3. No specific use for phonation listed.

Bubble jars were listed for Sp. 2; Ath. 1; Atax. 2. The use given for it was to coordinate a speech sound to the bubbles.

The chair foot support was listed as being used Sp. 1; Ath. 2; Atax. 2. There was no use given in connection with phonation.

The bottle straw was used as follows: Sp. 1; Ath. 1; Atax. 2. No specific use given.

The abdominal corset was used Sp. 1; Ath. 3; Atax. 0. No specific use was given.

The mandible stabilizer was listed Sp. 2; Ath. 2; Atax. 0. No specific use was given.

The following pieces of equipment were listed Sp. 1; Ath. 1; Atax. 1: tongue spoons, inclined plane, standing board. There was no specific use for phonation with any of these items.

The spirometer was indicated as being employed as follows: Sp. 1; Ath. 0; Atax. 1. There was no specific usage given.

The following apparatus were indicated as not being used for phonation: tongue-tip straws and the kymograph.

According to this study, the leading pieces of equipment for phonation with cerebral palsied children of the spastic, athetoid, and ataxic types are picture box, feather box, relaxation chair, form board, hearing tube and clown board.

For phonation the distribution of usage of the equipment seems to be comparatively low. The most frequently used, the picture box, was indicated as being used as follows: Sp. 7; Ath. 10; Atax. 10. The total for all pieces of equipment for each type of cerebral palsy is: Sp. 66; Ath. 72; Atax. 58. As can be seen from these figures, the range gives a 14 point difference between the highest, athetoid 72, and the lowest, ataxic 58. In general, all pieces of equipment had a low indication of usage.

A summary of previously discussed material will follow in table form.

TABLE II

PHONATION
FREQUENCY DISTRIBUTION OF EQUIPMENT

Equipment	Type of Cerebral Palsy		
	Sp.	Ath.	Atax.
Picture box	7	10	10
Feather box	6	7	6
Relaxation chair	5	6	4
Form board	5	5	5
Hearing tube	5	5	4
Clown picture	4	6	3
Bean bag	4	4	3
Clown board	3	3	3
Individual standing table	3	3	3
Sand bag	3	4	1
Breathing tube	2	3	2
Mandibular sling	4	2	0
Nursing straw	2	2	1
Nursing bottle	2	0	3
Bubble jars	2	1	2
Chair foot support	1	2	2
Bottle straw	1	1	2
Abdominal corset	1	3	0
Mandible stabilizer	2	2	0
Tongue spoons	1	1	1
Inclined plane	1	1	1
Standing board	1	1	1
Spirometer	1	0	1
Tongue-tip straws	0	0	0
Kymograph	0	0	0
	66	72	58

III. Tongue Control

The leading piece of equipment for establishing tongue control was the tongue spoon. The frequency of this item according to type of cerebral palsy is: Sp. 29; Ath. 26; Atax. 18. There were several different uses given for this item. The leading use was to apply resistance to the tongue; this could be employed for either passive or active resistance. The next leading use of the tongue spoon is to show the child his tongue position. Also mentioned as uses for this apparatus were: placing food on spoon in different mouth areas to stimulate tongue lateralization and elevation; and as kinesthetic cues for tongue placement.

The second most frequently listed agent was the tongue-tip straw. It occurred Sp. 8; Ath. 8; Atax. 4. The uses employed with the tongue-tip straws were: to help tongue position for definite sounds and to get the child to use tip of tongue.

Third leading piece of apparatus for establishing tongue control was the bottle straw. The returns according to type of cerebral palsy were: Sp. 7; Ath. 7; Atax. 4. The bottle straw as employed for tongue control was not listed with a specific use.

The nursing straw was enumerated as next most frequent item used for tongue control. It was listed for Sp. 6; Ath. 7; Atax. 4. This was used in a glass or cup, the stopper is

gradually cut away and/or a plastic straw is used alone, removing nipple as soon as possible.

The next leading medium was the nursing bottle. It was listed as follows: Sp. 5; Ath. 6; Atax. 2. There was no specific use given for tongue control.

Next most frequently enumerated item was the picture box. According to the returns on the questionnaire it was listed as follows: Sp. 4; Ath. 4; Atax. 5. There was no specific use given for this basic speech activity.

The following two items were listed the same number of times with different distribution according to type of cerebral palsy. This discussion will consider them according to their appearance on the questionnaire.

The clown board was used: Sp. 4; Ath. 4; Atax. 4. The child was asked to imitate the felt movable tongue to gain practice in tongue control.

The clown picture was itemized: Sp. 5; Ath. 4; Atax. 3. The clown picture was used for visual instruction in tongue and mandible control.

The next two items were used the same number of times with the same distribution for type of cerebral palsy, Sp. 3; Ath. 3; Atax. 3. The relaxation chair had no specific use given for tongue control; the individual standing table also had no specific usage given.

The mandible stabilizer was the next most frequently listed agent. Its occurrence was: Sp. 3; Ath. 4; Atax. 1. The uses given for tongue control were: insert a rubber block between molars to train selective tongue movement; place one block of dental plastic on each side of mouth (inside) and attach to wire. Extend wire out in front of mouth to obtain selective tongue movement.

The chair foot support was indicated as being used Sp. 2; Ath. 2; Atax. 2. There was no specific use given.

No specific use was given for the form board but it was listed for type of cerebral palsy Sp. 2; Ath. 2; Atax. 2.

The bean bag was indicated as being used Sp. 2; Ath. 2; Atax. 1. It was used with different mouth and tongue positions for demonstration.

The standing board was used according to type of cerebral palsy Sp. 1; Ath. 1; Atax. 1. No specific use was given for tongue control.

The next four items were indicated as being used twice. There was no specific use given for any of the items.

	Sp.	Ath.	Atax.
Breathing tube	1	1	0
Mandibular Sling	2	0	0
Feather box	1	1	0
Sand bag	1	1	0

The spirometer was listed Sp. 1; Ath. 0; Atax. 0. No use was given.

The next five items were listed as not being employed for tongue control for any type of cerebral palsy: hearing tube, bubble jars, abdominal corset, inclined plane, kymograph.

The totals for the three types of cerebral palsy were: Sp. 100; Ath. 86; Atax. 57. The spastic and athetoid are quite close with only a 14 point difference while the ataxic type cerebral palsy is 43 points lower. This would seem to indicate that either the ataxic needs less help on tongue control or that the apparatus listed on the questionnaire were not gainfully employed for the ataxic person.

The tongue spoons were the major item used for tongue control, with Sp. 29; Ath. 26; Atax. 18. They had an outstanding frequency since the range on the remaining 24 pieces was much lower and quite close. The second leading item was the tongue-tip straw and it dropped approximately 20 points with a frequency of Sp. 8; Ath. 8; Atax. 4.

A summary of previously discussed material will follow in table form.

TABLE III

TONGUE CONTROL
FREQUENCY DISTRIBUTION OF EQUIPMENT

Equipment	Type of Cerebral Palsy		
	Sp.	Ath.	Atax.
Tongue spoons	29	26	18
Tongue-tip straws	8	8	4
Bottle straw	7	7	4
Nursing straw	6	7	4
Nursing bottle	5	6	2
Picture box	4	4	5
Clown board	4	4	4
Clown picture	5	4	3
Relaxation chair	3	3	3
Individual standing table	3	3	3
Mandible stabilizer	3	4	1
Chair foot support	2	2	2
Form board	2	2	2
Bean bag	2	2	1
Standing board	1	1	1
Breathing tube	1	1	0
Mandibular sling	2	0	0
Feather box	1	1	0
Sand bag	1	1	0
Spirometer	1	0	0
Hearing tube	0	0	0
Bubble jars	0	0	0
Abdominal corset	0	0	0
Inclined plane	0	0	0
Kymograph	0	0	0
	100	86	57

IV. Opening and Closing Mouth

The most frequently used item for opening and closing the mouth was the bubble jar. It was listed: Sp. 11; Ath. 10; Atax. 8. It was used to strengthen palatal muscles and to establish lip control.

The second most frequently listed equipment was the bottle straw. It was used with cerebral palsy: Sp. 10; Ath. 8; Atax. 7. An atomizer helps to push a liquid most of the way up a straw which is securely tightened in a cup with an airtight cover. The child sucks the liquid up through the straw the remaining distance.

The third leading piece of equipment used to teach the opening and closing of the mouth was the clown picture. Its incidence was Sp. 9; Ath. 8; Atax. 5. It is used to imitate movement of articulators or expression seen in clown pictures. These pictures can be on the wall in the speech room or in a deck of cards for group games.

The next two items were listed 18 times each.

The nursing straw was indicated as being used Sp. 6; Ath. 6; Atax. 6. There was no particular use for this item for this speech activity.

The feather box was checked according to type of cerebral palsy as Sp. 7; Ath. 5; Atax. 6. There was no use given for this item for this speech activity.

The next most frequently used apparatus was the clown board. Its indicated usage was Sp. 3; Ath. 5; Atax. 5. There was no specific utilization indicated.

Tongue spoons were indicated as being the next most frequently used equipment with an incidence of Sp. 5; Ath. 5; Atax. 2. They are utilized to effect lip and jaw closure.

The mandibular sling was also used 12 times with a distribution according to cerebral palsy as Sp. 5; Ath. 6; Atax. 1. There are several uses given for this apparatus. They are as follows: to control excessive jaw movement during speech; use from shorter to longer periods to approximate jaws more; discourages relaxed mandible and tongue protrusion; to control extensor thrust.

The following three items were listed 10 times each.

The mandible stabilizer was enumerated as follows: Sp. 3; Ath. 6; Atax. 1. The uses indicated for this piece of equipment are: to prevent hyper extension of mandible especially during walking and hand activities. Limits the wide excursion of mandible; to keep jaw from slipping from facets.

The picture box was listed Sp. 3; Ath. 3; Atax. 4. There was no particular use given for this speech activity.

According to type of cerebral palsy the relaxation chair was listed Sp. 3; Ath. 4; Atax. 3. No special usage was given.

The nursing bottle was the next most frequently mentioned item with the following occurrence: Sp. 4; Ath. 2; Atax. 3. There was no use given for this speech activity.

The next leading apparatus was the breathing tube which was used Sp. 2; Ath. 4; Atax. 2. No specific use was given for opening and closing the mouth.

The form board, chair foot support, and individual standing table had the same occurrence according to type of cerebral palsy: Sp. 2; Ath. 2; Atax. 2. None of these apparatus had any use given for this speech activity.

The bean bag, inclined plane, and tongue-tip straws were listed as having the following occurrence: Sp. 2; Ath. 2; Atax. 1. None of the items had a particular usage given for opening and closing the mouth.

The standing board was listed Sp. 1; Ath. 1; Atax. 1. No specific use was given for this basic speech activity.

The sand bag was given no specific usage for opening and closing the mouth but was listed Sp. 1; Ath. 1; Atax. 0.

The hearing tube, abdominal corset, spirometer and kymograph were listed as not being used for opening and closing the mouth with any of the types of cerebral palsy.

The total incidence for each of the three types of cerebral palsy was as follows: Sp. 85; Ath. 86; Atax. 63. The distribution of usage of the apparatus is limited with no

one piece showing an unusually high usage. The bubble jar was indicated as being the highest piece of equipment with a distribution of Sp. 11; Ath. 10; Atax. 8.

A summary of previously discussed material will follow in table form.

TABLE IV

OPENING AND CLOSING MOUTH
FREQUENCY DISTRIBUTION OF EQUIPMENT

Equipment	Type of Cerebral Palsy		
	Sp.	Ath.	Atax.
Bubble jar	11	10	8
Bottle straw	10	8	7
Clown picture	9	8	5
Nursing straw	6	6	6
Feather box	7	5	6
Clown board	3	5	5
Tongue spoons	5	5	2
Mandibular sling	5	6	1
Mandible stabilizer	3	6	1
Picture box	3	3	4
Relaxation chair	3	4	3
Nursing bottle	4	2	3
Breathing tube	2	4	2
Form board	2	2	2
Chair foot support	2	2	2
Individual standing table	2	2	2
Bean bag	2	2	1
Inclined plane	2	2	1
Tongue-tip straws	2	2	1
Standing board	1	1	1
Sand bag	1	1	0
Hearing tube	0	0	0
Abdominal corset	0	0	0
Spirometer	0	0	0
Kymograph	0	0	0
	85	86	63

V. Peristaltic Movement

The bottle straw was the major piece of equipment indicated for establishing peristaltic movement. It was registered Sp. 9; Ath. 9; Atax. 8. The methods used for this item were: for blowing and sucking exercises; use until child gains sufficient control to use a straw in a glass, helps drooling, swallowing, lip muscular control.

The nursing straw was the second major apparatus used to establish this speech activity. It was indicated as having the following frequency: Sp. 5; Ath. 4; Atax. 5. Its uses were: to teach sucking, lip control, control drooling and motivate swallowing.

The relaxation chair was the third major item listed for this purpose. The returns according to use with type of cerebral palsy were Sp. 5; Ath. 4; Atax. 4. There was no specific usage given for the establishing of peristaltic movement.

The next most frequently indicated item was the nursing bottle with a return of Sp. 4; Ath. 2; Atax. 4. The methods of usage were: use on a table or mattress, placing the child on his stomach in a struggle position; by placing the child in an upside down position the nursing bottle helps to establish sucking, lip closure and drool control.

The chair foot support was the fifth item most frequently used. The occurrence of this item according to

type of cerebral palsy was Sp. 3; Ath. 3; Atax. 3. There was no particular usage given for this type of cerebral palsy.

With an occurrence of Sp. 3; Ath. 3; Atax. 2, the picture box was the next leading apparatus. There was no special usage given for establishing peristaltic movement.

Next most frequently listed item was the tongue-tip straw. Their frequency for usage with types of cerebral palsy was Sp. 3; Ath. 3; Atax. 1. They were indicated as being used to strengthen swallowing and sucking.

The form board was next with an incidence of Sp. 2; Ath. 1; Atax. 2. There was no usage given for this basic speech activity.

The bean bag and the sand bag both occurred with the frequency of Sp. 2; Ath. 2; Atax. 0. Neither of the two items had a specific usage listed for peristaltic movement.

The individual standing table and the spirometer both indicated the same frequency for type of cerebral palsy, Sp. 1; Ath. 1; Atax. 1. No special use was given for either of the items to establish this speech activity.

The tongue spoons, abdominal corset and the clown picture also had the same listing, Sp. 1; Ath. 1; Atax. 0. There was no use given for this category for any of the above items.

There were ten items which registered Sp. 0; Ath. 0;

Atax. 0 in occurrence. They were: breathing tube, hearing tube, bubble jars, feather box, clown board, mandibular sling, mandible stabilizer, kymograph, standing board, and inclined plane.

The total for each type of cerebral palsy for peristaltic movement was Sp. 43; Ath. 37; Atax. 31. This would appear to be low, indicating that there are not many pieces of equipment in this study used to establish peristaltic movement. There were ten items that were not used at all for this speech activity. The bottle straw with the highest frequency was only Sp. 9; Ath. 9; Atax. 8 and the nursing straw which was the second most frequently used item occurred only Sp. 5; Ath. 5; Atax. 5.

A summary of previously discussed material will follow in table form.

TABLE V

PERISTALTIC MOVEMENT
FREQUENCY DISTRIBUTION OF EQUIPMENT

Equipment	Type of Cerebral Palsy		
	Sp.	Ath.	Atax.
Bottle straw	9	9	8
Nursing straw	5	4	5
Relaxation chair	5	4	4
Nursing bottle	4	2	4
Chair foot support	3	3	3
Picture box	3	2	2
Tongue-tip straws	3	3	1
Form board	2	1	2
Bean bag	2	2	0
Sand bag	2	2	0
Individual standing table	1	1	1
Spirometer	1	1	1
Tongue spoons	1	1	0
Abdominal corset	1	1	0
Clown picture	1	1	0
Breathing tube	0	0	0
Hearing tube	0	0	0
Bubble jars	0	0	0
Feather box	0	0	0
Clown board	0	0	0
Mandibular sling	0	0	0
Mandible stabilizer	0	0	0
Kymograph	0	0	0
Standing board	0	0	0
Inclined plane	0	0	0
	43	37	31

VI. Relaxation

The leading piece of equipment used in establishing relaxation was the relaxation chair. Its occurrence for each type of cerebral palsy was Sp. 23; Ath. 26; Atax. 19. The uses and design listed for this item were: this chair is especially designed with an adjustable head, foot and arm rest; it should place the child in a sitting position, maintain good posture and hold head and body still for therapy.

The chair foot support was the second most frequently listed apparatus. It was indicated that this item was used Sp. 17; Ath. 21; Atax. 13. The purposes of this apparatus were listed as: maintenance of seated position; control of feet and support of feet; additional security. It was suggested that the chair foot support might be a part of the relaxation chair and should be adjustable for height.

Third leading item was the sand bag with Sp. 16; Ath. 29; Atax. 5 occurrence of usage. The methods of utilizing this piece of equipment were: stabilization and control of excessive movement; head control; support. It was suggested that sand bags might be employed with plinths for immobilization.

The fourth principle apparatus was the bean bag with a frequency of Sp. 5; Ath. 7; Atax. 2. This equipment was used for balance and head control; better posture by place-

ment on top of the head; and for hand control.

The individual standing table is listed next according to frequency. The indication of usage for this item was Sp. 5; Ath. 4; Atax. 3. The suggested usage and construction of this piece of equipment was: to control extraneous movement; for support and training in standing; to practice conversation for child who can not stand or walk independently; for best functional position; improving muscle strength and control; for use during therapy because the stabilization of trunk and legs leaves the hands free and is conducive to more satisfactory speech. The table should have adjustable legs and a cut out so that it can be used with standing board, relaxation chair or with standard chairs.

The next leading item is the picture box with an indication of the following usage: Sp. 2; Ath. 3; Atax. 4. There is no specific usage cited for this equipment for relaxation.

The inclined plane was used for relaxation with a frequency of Sp. 3; Ath. 2; Atax. 2. It was listed as giving better visual perception.

The next two items were listed with different distribution but the same frequency:

The clown board, Sp. 2; Ath. 2; Atax. 2, was used for interest and motivation.

The mandibular sling had no specific usage given for relaxation but the distribution was Sp. 3; Ath. 3; Atax. 0.

The next three items occurred with a frequency of five:

Tongue spoons were used with each type of cerebral palsy as follows: Sp. 2; Ath. 2; Atax. 1. There was no particular use given for this speech activity.

The standing board occurred with the frequency of Sp. 2; Ath. 2; Atax. 1 and was used to give child a functional position, build muscles and give change of position.

The form board was indicated for utilization with each type of cerebral palsy: Sp. 1; Ath. 1; Atax. 3, but had no special use listed for this function.

The next two pieces of equipment were listed four times each and since the distribution was not the same will appear individually according to appearance on the questionnaire:

The feather box appeared with this distribution Sp. 2; Ath. 0; Atax. 2.

The abdominal corset was indicated for usage Sp. 1; Ath. 3; Atax. 0. Neither of these two items was given a specific use for establishing relaxation.

There were five items indicated with a frequency of three:

The bottle straw and nursing straw both appeared Sp. 1; Ath. 1; Atax. 1. There was no specific use given for

either of these two apparatus.

The bubble jar had a distribution of Sp. 2; Ath. 0; Atax. 1. No particular use for relaxation was given.

The clown picture was used for the types of cerebral palsy as follows: Sp. 2; Ath. 1; Atax. 0. No use was given to establish relaxation.

The mandible stabilizer had no specific use indicated for this basic speech activity but occurred with the distribution Sp. 1; Ath. 2; Atax. 0.

Neither the breathing tube nor the nursing bottle had a specific use listed but were indicated Sp. 1; Ath. 0; Atax. 1 and Sp. 1; Ath. 0; Atax. 0 respectively.

There were four items which were shown not to be used for establishing relaxation. They were hearing tube, tongue-tip straws, spirometer and kymograph.

The total distribution for equipment used for relaxation was Sp. 93; Ath. 110; Atax. 61. This indicates that equipment is used frequently to establish relaxation for the athetoid and spastic types of cerebral palsy. The athetoid type exceeds the spastic by 17 points while the ataxic is the lowest by forty-nine points.

For the basic speech activity of relaxation there were three major pieces of equipment indicated. The relaxation chair was first with a distribution of Sp. 23; Ath. 26; Atax. 19, the chair foot support was second with a distri-

bution of Sp. 17; Ath. 21; Atax. 13, and the sand bag was third with a distribution of Sp. 16; Ath. 29; Atax. 5. The fourth place apparatus, bean bag, dropped to a distribution of Sp. 5; Ath. 7; Atax. 2. The total of the three major items for each type of cerebral palsy Sp. 56; Ath. 76; Atax. 37, seems to indicate that the athetoid type of cerebral palsy is the one most in need of assistance for relaxation.

A summary of previously discussed material will follow in table form.

TABLE VI

RELAXATION
FREQUENCY DISTRIBUTION OF EQUIPMENT

Equipment	Type of Cerebral Palsy		
	Sp.	Ath.	Atax.
Relaxation chair	23	26	19
Chair foot support	17	21	13
Sand bag	16	29	5
Bean bag	5	7	2
Individual standing table	5	4	3
Picture box	2	3	4
Inclined plane	3	2	2
Clown board	2	2	2
Mandibular sling	3	3	0
Tongue spoons	2	2	1
Standing board	2	2	1
Form board	1	1	3
Feather box	2	0	2
Abdominal corset	1	3	0
Bottle straw	1	1	1
Nursing straw	1	1	1
Bubble jar	2	0	1
Clown picture	2	1	0
Mandible stabilizer	1	2	0
Breathing tube	1	0	1
Nursing bottle	1	0	0
Hearing tube	0	0	0
Tongue-tip straws	0	0	0
Spirometer	0	0	0
Kymograph	0	0	0
	93	110	61

VII. Other

To gain a more complete picture, this study included in the questionnaire a column for other uses of the equipment besides the six basic speech activities, breath control, phonation, tongue control, opening and closing the mouth, peristaltic movement, relaxation.

Frequently this column was marked by the addressee without further clarification. However, the following will be a discussion of this equipment according to frequency of occurrence and of the specific methods used if they were indicated.

The hearing tube was the item most frequently checked for other uses with an incidence of Sp. 9; Ath. 19; Atax. 9. The application of this item was: for hearing training; for the hard of hearing; motivation; to hear own voice.

Second leading item indicated for other usage was the bottle straw. It was listed Sp. 13; Ath. 8; Atax. 7. There was no clarification of other uses for this apparatus.

The individual standing table was the third most frequently mentioned item for other uses. It was listed Sp. 8; Ath. 11; Atax. 9. No further suggestion for use was specified.

The relaxation chair was the next highest item suggested for further usage. Its incidence of occurrence according to type of cerebral palsy was Sp. 9; Ath. 9;

Atax. 5. The application given for other use of this item was to carry out physical therapy orders.

The following items occurred 21 times although the distribution according to type of cerebral palsy was different:

The bean bag was used for motivation. Also a variety of bags, variety of substance, and variety of material and shape was suggested to give tactile experience. This item was listed Sp. 9; Ath. 8; Atax. 5.

The form board had an incidence of Sp. 6; Ath. 8; Atax. 7. This apparatus was used: to teach shapes, sizes; to establish psychological resolve; for visual perception and language comprehension; and in occupational therapy.

The chair foot support had no specific usage given but was indicated for other uses according to each type of cerebral palsy as follows: Sp. 7; Ath. 9; Atax. 5.

The nursing bottle had no further suggested usage given but was indicated as Sp. 9; Ath. 6; Atax. 5.

The sand bag had the following listing: Sp. 5; Ath. 10; Atax. 2. This was indicated as being further used on conjunction with physical therapy orders.

The picture box was used for motivation, carry-over, and psychological testing. It had an occurrence according to type of cerebral palsy as follows: Sp. 4; Ath. 6; Atax. 3.

The nursing straw had an incidence of Sp. 3; Ath. 7; Atax. 2. The uses suggested for this item were: to develop tactile sense, in conjunction with occupational therapy.

The bubble jar had no specific use indicated but was listed as follows: Sp. 4; Ath. 4; Atax. 3.

The inclined plane was used in conjunction with the physical therapist. The incidence of this item was Sp. 5; Ath. 2; Atax. 3.

The spirometer was listed for other uses as follows: Sp. 3; Ath. 5; Atax. 2. The suggested use was for testing and practice.

The next two items had the same occurrence with different distribution. Neither of the two had further uses suggested: the tongue spoons Sp. 3; Ath. 2; Atax. 2, the clown board Sp. 2; Ath. 3; Atax. 2.

The next two items listed had no specific use indicated. They had different distribution but were checked six times each. The feather box was indicated for other uses Sp. 3; Ath. 2; Atax. 1, and the clown picture occurred Sp. 2; Ath. 2; Atax. 2.

With a listing of five each the following two items are the next apparatus to be mentioned according to frequency: the mandibular sling Sp. 1; Ath. 4; Atax 0; the standing board Sp. 1; Ath. 2; Atax. 2. Neither of the two items had a special use listed.

The kymograph was indicated as being used in some other manner with the following frequency: Sp. 1; Ath. 1; Atax. 0. The use listed was for practice work.

The breathing tube was suggested as being used to amplify tones and for motivation. It was listed Sp. 0; Ath. 0; Atax. 1.

With an indication of Sp. 1; Ath. 0; Atax. 0, the mandible stabilizer was the next item on the list. No specific usage was given.

The abdominal corset and the tongue-tip straws were indicated as having no use other than the six basic speech activities.

The totals for other uses of the equipment for each different type of cerebral palsy were Sp. 108; Ath. 138; Atax. 77. The athetoid type cerebral palsy was the type which seemed most frequently to utilize methods other than those listed in the questionnaire. The spastic type cerebral palsy was second most frequently listed being 30 points behind the athetoid type. The ataxic type was 61 points behind the athetoid type which would indicate a lower use other than the ones listed.

It should be remembered that although the total for other uses was comparatively high there were only 11 of the pieces out of the 25 which had the other uses listed.

A summary of previously discussed material will follow in table form.

TABLE VII

OTHER
FREQUENCY DISTRIBUTION OF EQUIPMENT

Equipment	Type of Cerebral Palsy		
	Sp.	Ath.	Atax.
Hearing tube	9	19	9
Bottle straw	13	8	7
Individual standing table	8	11	9
Relaxation chair	9	9	5
Bean bag	9	8	5
Form board	6	8	7
Chair foot support	7	9	5
Nursing bottle	9	6	5
Sand bag	5	10	2
Picture box	4	6	3
Nursing straw	3	7	2
Bubble jar	4	4	3
Inclined plane	5	2	3
Spirometer	3	5	2
Tongue spoons	3	2	2
Clown board	2	3	2
Feather box	3	2	1
Clown picture	2	2	2
Mandibular sling	1	4	0
Standing board	1	2	2
Kymograph	1	1	0
Breathing tube	1	0	0
Mandible stabilizer	1	0	0
Abdominal corset	0	0	0
Tongue-tip straws	0	0	0
	108	138	77

VIII. Total Use of Equipment

Following will be a discussion of the total use of each piece of equipment according to frequency for all basic speech activities.

The leading item, the relaxation chair was indicated 130 times for the six basic speech activities. This apparatus was used most often to establish relaxation. The indication according to type of cerebral palsy was Sp. 23; Ath. 26; Atax. 19.

Second most frequently used piece of equipment according to this study was the bottle straw. The indication of of use for this item was 106. The bottle straw was used most frequently to establish breath control. The distribution was Sp. 11; Ath. 11; Atax. 8.

Bubble jars were the third leading apparatus with a total of 100. They were indicated most frequently to establish breath control with a frequency of Sp. 22; Ath. 25; Atax. 16.

Fourth item was the feather box with a total of 98. The major speech activity utilizing this item was breath control with a distribution according to each type of cerebral palsy as follows: Sp. 19; Ath. 20; Atax. 16.

Also having a total of 98 were the tongue spoons. These apparatus were used most frequently to establish tongue control. The distribution for these was Sp. 29; Ath. 26;

Atax. 18.

The chair foot support had a total of 83 placing it fifth according to frequency. The major use for basic speech activity was relaxation with an occurrence of Sp. 17; Ath. 21; Atax. 13.

The next most frequently used item was the sand bag. This equipment had a total of 72 and was most frequently used for relaxation. The distribution according to each type of cerebral palsy was Sp. 16; Ath. 29; Atax. 5.

The nursing straw had a total of 71 which made it the next leading item. It was used most often with opening and closing the mouth. The distribution for the nursing straw to establish the basic speech activity was Sp. 6; Ath. 6; Atax. 6.

The picture box was the next most frequently used piece of equipment with a total of 70. This apparatus was most frequently used with the basic speech activity of phonation. The listing according to each type of cerebral palsy with this speech activity was Sp. 7; Ath. 10; Atax. 10.

With a total of 60 the clown board was the next most often used item. It was used most frequently for breath control with an occurrence of Sp. 7; Ath. 7; Atax. 6.

The clown picture had a total of 58 and was used most

often to open and close the mouth and had an incidence according to all types of cerebral palsy as follows: Sp. 9; Ath. 8; Atax. 5.

The nursing bottle was the next most often used apparatus with a total of 47. This equipment was used most often for tongue control with a frequency of Sp. 5; Ath. 6; Atax. 2.

The bean bag had a total of 45 and was used most often with the basic speech activity of relaxation and had the following distribution: Sp. 5; Ath. 7; Atax. 2.

The next most often used item was the breathing tube with a total of 44. This apparatus was used to establish breath control with a distribution according to type of cerebral palsy as follows: Sp. 9; Ath. 10; Atax. 6.

The individual standing table had a total of 43 and was used primarily for relaxation with an occurrence of Sp. 5; Ath. 4; Atax. 3.

The inclined plane showed a total of 42. This item was used to establish breath control with an indication of Sp. 9; Ath. 13; Atax. 5.

The form board was used most often for phonation. This item had a total of 40 and a distribution according to each type of cerebral palsy Sp. 5; Ath. 5; Atax. 5.

The tongue-tip straws had a total of 37. This appa-

ratus was used most often to establish tongue control with an indication according to type of cerebral palsy of Sp. 8; Ath. 8; Atax. 4.

The mandibular sling was used most frequently to establish opening and closing the mouth. This item had a total of 26 and distribution for basic speech activity of: Sp. 5; Ath. 6; Atax. 1.

The mandible stabilizer was the next most frequently mentioned item with a total of 25. This apparatus was used most often with the basic speech activity of opening and closing the mouth. The distribution according to type of cerebral palsy was Sp. 3; Ath. 6; Atax. 1.

The abdominal corset had a total of 20 and was used to establish breath control with a distribution of Sp. 2; Ath. 8; Atax. 0.

The hearing tube had a total of 19 and was used with the speech activity of phonation with a distribution of Sp. 5; Ath. 5; Atax. 4.

The standing board had a total of 17 and was used most often for relaxation with an incidence according to each type of cerebral palsy of Sp. 2; Ath. 2; Atax. 1.

The spirometer had a total of 15 and was used most often for breath control with an incidence Sp. 3; Ath. 3; Atax. 3.

The kymograph was the least used item with a total of

7. This item was used for only one activity, breath control. The distribution according to cerebral palsy was Sp. 3; Ath. 4; Atax. 0.

There are several items which have an appreciable indication of use for a single activity although they do not necessarily rate among the foremost items for over-all usage. The tongue spoons had an over-all total of 98 placing them fifth in rating of equipment. However, for tongue control they had a distribution of Sp. 29; Ath. 26; Atax. 18. This is 73 out of the total 98 points which would seem to indicate that the primary use of tongue spoons is for tongue control.

The relaxation chair was the leading piece of equipment on the total basis with 130. It had a single distribution for relaxation of Sp. 23; Ath. 26; Atax. 19. This use for relaxation chair gives 68 out of the total 130 points.

The bubble jar was used for breath control as follows: Sp. 22; Ath. 25; Atax. 16. This apparatus was rated third in over-all usage with a total of 100, and 63 of these points were for breath control.

The feather box rated fourth with a total of 98 points. Fifty-five of these points were assigned to breath control with a distribution of Sp. 19; Ath. 20; Atax. 16.

The sand bag was the seventh item on the scale with a total of 72 points. For relaxation this item had 50 points

with the following distribution: Sp. 16; Ath. 29; Atax. 5.

These items were the outstanding apparatus for the speech activity mentioned. This would seem to indicate that while some other items (i. e. bottle straw with total distribution of Sp. 1; Ath. 1; Atax. 8) might have more over-all use, the above pieces of equipment were outstanding for certain activities.

A summary of previously discussed material will follow in table form.

TABLE VIII

TOTAL USE OF EQUIPMENT
FOR THE SIX BASIC SPEECH ACTIVITIES

Equipment	Total Use
Relaxation chair	130
Bottle straw	106
Bubble jars	100
Feather box	98
Tongue spoons	98
Chair foot support	83
Sand bag	72
Nursing straw	71
Picture box	70
Clown board	60
Clown picture	58
Nursing bottle	47
Bean bag	45
Breathing tube	44
Individual standing board	43
Inclined plane	42
Form board	40
Tongue-tip straws	37
Mandibular sling	26
Mandible stabilizer	25
Abdominal corset	20
Hearing tube	19
Standing board	17
Spirometer	15
Kymograph	7

IX. Other Equipment Mentioned

The following items were listed supplementary to the questionnaire. These pieces in some instances had an indication of frequent usage. They will be listed below according to frequency of listing.

The tape recorder was the most often mentioned item. It was used for self-evaluation and was indicated 17 times.

The audiometer was listed 8 times and no specific use given.

Mirrors had an additional listing and were mentioned 4 times. This item was used for visual stimulation.

The metronome was used for muscular control and was listed 3 times.

The Maico-train-car was used for auditory training and phonemic discrimination and was also listed 3 times.

Musical toys were listed twice and indicated for phonation.

Also listed twice were the rubber stopper and buttons which were used for lip activity.

The following apparatus were listed only one time. If there was a specific use given it was mentioned.

Speech table; head mirror; phonendoscope; stop watch; chronomolizer (Maico Co.); sound clown; skis, used for individual standing with association exercises. Puzzles

were used for association and carry-over of sound. Rubber tubing, used for tongue control; plinth, used for examination, belly feeding, relaxation, breath control and phonation; communication boards; wristlets; leather neck support; iron lung.[26] Corks, lip control; rocking chair, breath control; blackboard, visual stimulation. The following apparatus for breathing exercises were listed: bed, feather games and ping pong. The coated finger was used for tongue and lip manipulation.

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26. The iron lung was used experimentally by Robert Harrington, Orthopedic Hospital, Los Angeles, California.

Chapter IV

SUMMARY AND CONCLUSIONS

Chapter IV

SUMMARY AND CONCLUSIONS

The purpose of this study has been to correlate special equipment used in speech improvement for the cerebral palsied with the basic speech activities attained and the type of cerebral palsy for which it is used. This study was conducted on a survey basis. A questionnaire and letter of explanation were sent to cerebral palsy centers throughout the country. There were 105 questionnaires sent. There was a 43% return of answered questionnaires, 24% partial replies which gave a total return of 67%.

I. Summary

The basic speech activities had the following returns:

BREATH CONTROL

Total use of equipment 331 (Sp. 116, Ath. 134, Atax. 81)

Leading apparatus: bubble jar (Sp. 22, Ath. 25, Atax. 16)

PHONATION

Total use of equipment 226 (Sp. 66, Ath. 72, Atax. 16)

Leading apparatus: picture box (Sp. 7, Ath. 10, Atax. 10)

TONGUE CONTROL

Total use of equipment 243 (Sp. 100, Ath. 86, Atax. 57)

Leading apparatus: tongue spoons (Sp. 29, Ath. 26, Atax. 18)

OPENING AND CLOSING MOUTH

Total use of equipment 228 (Sp. 85, Ath. 86, Atax. 57)

Leading apparatus: bubble jar (Sp. 11, Ath. 10, Atax. 8)

PERISTALTIC MOVEMENT

Total use of equipment 111 (Sp. 43, Ath. 37, Atax. 31)

Leading apparatus: bottle straw (Sp. 9, Ath. 9, Atax. 8)

RELAXATION

Total use of equipment 264 (Sp. 93, Ath. 110, Atax. 61)

Leading apparatus: relaxation chair (Sp. 23, Ath. 26, Atax. 19)

OTHER

Total for other uses 323 (Sp. 108, Ath. 138, Atax. 77)

Leading apparatus: hearing tube (Sp. 9, Ath. 19, Atax. 9)

EQUIPMENT

Leading apparatus for all six activities: relaxation chair

Total for all six activities 130

Used most often for activity relaxation (Sp. 23, Ath. 26, Atax. 19)

Second leading item: bottle straw

Total use for six activities 106

Used most often for activity breath control (Sp. 11, Ath. 11, Atax. 8)

Third leading item: bubble jar

Total use for six activities 100

Used most often for activity breath control (Sp. 22, Ath. 25, Atax. 16)

OTHER EQUIPMENT

There were only two items listed more than four times. They were:

Recorder listed 17 times

Use: self-evaluation

Audiometer listed 8 times

Use: none listed

TOTALS FOR TYPE OF CEREBRAL PALSY

Athetoid 525

Spastic 503

Ataxic 351

II. Conclusions

As a result of this study the following conclusions would appear to be warranted:

1. The athetoid type cerebral palsy utilized the most special equipment in speech improvement.
2. Breath control was the basic speech activity which most often employed special equipment.
3. The relaxation chair was the apparatus used most often for speech improvement with cerebral palsied children.

III. Recommendations

The author would recommend for further studies in the field the following:

1. A survey be made to see if lack of use of equipment is due to unavailability because of expense, space or uselessness.

2. A study be made of equipment still considered to be in the experimental stage for consideration of merit of future use.

3. A study be made to see if lack of use of equipment is due to: (a) lack of knowledge of equipment available and proven to be helpful, (b) lack of training in the use of highly technical apparatus.

4. A study be done to see if limitations for use of equipment is due to: (a) non-inclusion in specific orders for therapy from physical therapist and doctor in charge, (b) the duplication of equipment necessary for use by speech therapist, physical therapist and occupational therapist.

5. A study be made to see what equipment is utilized in public school speech correction with cerebral palsied children.

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APPENDIX

The following three items are the letter which accompanied the questionnaire, the questionnaire used for the study, and a duplication of the postal card used in the study.

MICHIGAN STATE COLLEGE
EAST LANSING

SCHOOL OF SCIENCE AND ARTS
DEPARTMENT OF SPEECH, DRAMATICS,
AND RADIO EDUCATION

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May 4, 1953

Dear Sir:

In connection with the graduate program of the speech clinic at this institution I am doing a study in the field of cerebral palsy. The purpose of this study is to correlate special equipment used in speech improvement for the cerebral palsied with the basic speech activities attained and the type of cerebral palsy for which it is used. For this study it is necessary to obtain information from those centers which are the leaders in working with the children who have cerebral palsy. The list of clinics for this study was chosen from special referrals by individuals considered to be authorities in the field of cerebral palsy.

Would you be kind enough to fill out the enclosed questionnaire and mail it back to me at your earliest convenience. Upon completion of this study I will be happy to send you a summary of the results.

Your cooperation in this matter will be greatly appreciated. I might add that my interest in this field is more than a cursory one since I have a cerebral palsy involvement myself.

Sincerely,

Betty Hackleman

(Miss) Betty Hackleman

Michigan State College
Speech Department
East Lansing, Michigan

Questionnaire Form

The Use of Special Equipment in Speech Therapy with Cerebral Palsied Children

Name _____ Clinic _____

Position _____ Address _____

INSTRUCTIONS: Place check (✓) within square that indicates areas of use.

Equipment	Basic Speech Activities							Type of Cerebral Palsy		
	Breath Control	Phonation	Tongue Control	Opening and Closing mouth	Paris-taltic movement	Relax-ation	Other	Spastic	Athetoid	Ataxia
1. Breathing Tube										
How equipment used:										
2. Hearing Tube										
How equipment used:										
3. Bottle Straw										
How equipment used:										
4. Nursing Straw										
How equipment used:										
5. Nursing Bottle										
How equipment used:										
6. Tongue Spoons										
How equipment used:										

Equipment	Basic Speech Activities							Type of Cerebral Palsy		
	Breath Control	Phonation	Tongue Control	Opening and Closing mouth	Paris-taltic movement	Relax-ation	Other	Spastic	Athetoid	Ataxia
7. Tongue-tip straws										
How equipment used:										
8. Bubble Jars										
How equipment used:										
9. Feather Box										
How equipment used:										
10. Clown Board										
How equipment used:										
11. Clown Picture										
How equipment used:										
12. Abdominal Corset										
How equipment used:										
13. Mandibular sling										
How equipment used:										

Equipment	Basic Speech Activities							Type of Cerebral Palsy		
	Breath Control	Phonation	Tongue Control	Opening and Closing mouth	Paris-taltic movement	Relax-ation	Other	Spastic	Athetoid	Ataxia
14. Mandible Stabilizer										
How equipment used:										
15. Bean Bag										
How equipment used:										
16. Sand Bags										
How equipment used:										
17. Inclined Plane										
How equipment used:										
18. Standing Board										
How equipment used:										
19. Form Board										
How equipment used:										
20. Picture Box										
How equipment used:										

Equipment	Basic Speech Activities							Type of Cerebral Palsy		
	Breath Control	Phonation	Tongue Control	Opening and Closing mouth	Paris-taltic movement	Relax-ation	Other	Spastic	Athetoid	Ataxia
21. Relaxation Chair										
How equipment used:										
22. Chair Foot Support										
How equipment used:										
23. Individual Standing Table										
How equipment used:										
24. Spirometer										
How equipment used:										
25. Kymograph										
How equipment used:										
26. Other Special Equipment and general comments:										

May 18, 1953

Dear Sir:

I wrote to you on May 4 requesting information on the use of special equipment used in speech correction with the cerebral palsied child. This information was to be in questionnaire form. To date the questionnaire has not been received.

Would it be possible for you to send these data to me by June 1? If the questionnaire has been misplaced I will be happy to send you another.

Thank you again for your kind cooperation.

Sincerely,
Betty Hackleman
Speech Department

Michigan State College
East Lansing, Michigan

Letters of Adverse Criticism

It is evident from this study that the author does not share the following opinions. However, it must be recorded that all the replies to the study were not of a favorable nature, therefore the following letters will be included:

Dear Miss Hackleman:

I am returning your questionnaire with this brief explanation of why I did not fill it out:

I do not believe that such a check-list of special equipment in speech therapy with cerebral palsied children will help the cause of cerebral palsy. In fact, there is danger that this kind of research may do more harm than good.

I do not believe that a person who is actually working with the speech problems of the cerebral palsied from day to day can honestly and with professional integrity check your list of equipment as to application for basic speech activities on your form and as to type of cerebral palsy. On type of cerebral palsy alone the therapist who actually works with cerebral palsy knows that all sorts of difficulties in classification arise which are not apparent in books of theory. For example, one of the boys in the Training Center here has been classified by one neurologist as spastic with athetoid features, and by another as athetoid, tension type. One of our girls has been classified as spastic, as athetoid, tension type, and as mixed type. (With her none of the equipment listed is practicable or useful. Whether it would have been when she was younger, if training had been available for her fifteen years ago, is something a questionnaire like yours does not permit discussing, and therefore the wrong picture is given.) In clinics where only one doctor's diagnosis is used, the problem of classification is over-simplified. Here our diagnostic clinic consists of three doctors, and often there is classification from a clinic or medical center in some other city.

. . . Paragraph omitted because of irrelevance

It is with regret that I decline cooperating with you in your project. The forcing of answers to meet your form limitations would do injury to the cause. I talked over the problem with the physical therapist and the occupational therapist in our Center, and they said in their fields also, such a check-list is valueless.

Sincerely yours,

Name withheld

- -

My dear Miss Hackleman:

This reply is not to be considered a criticism of the procedures implied in your questionnaire. However I find it impossible to state in tabular form the procedures by which are handled the individual problems found in speech disorders of the child with cerebral palsy.

Although degree of emphasis in a type of procedure may differ from spastic, athetoid, and ataxic, basic speech training is the same for all, and any one problem may occur in any of those types. Specifically, confusion between lip and tongue response may be found in any one.

Further, I myself use a mechanical device only as a last resort. They usually produce fractional responses which are more effectively established through suggestion, or motivation, or physical contact with the therapist, and as part of a functional whole.

I am sorry not to cooperate more fully in your project, but I prefer not to give a false impression of what I consider successful practice.

Sincerely yours,

Name withheld
Speech Therapist

MASTER CHART

Total Frequency Distribution of Equipment According to Data Returned on Questionnaire

Equipment	Basic Speech Activity																						Total
	Breath Control			Phonation			Tongue Control			Opening and Closing Mouth			Peristaltic Movement			Relaxation			Other			
	Sp	Ath	At	Sp	Ath	At	Sp	Atn	At	Sp	Ath	At	Sp	Ath	At	Sp	Ath	At	Sp	Atn	At	
Breathing Tube	9	10	6	2	3	2	1	1	0	2	4	2	0	0	0	1	0	1	0	0	1	44
Hearing Tube	2	2	1	5	5	4	0	0	0	0	0	0	0	0	0	0	0	0	9	19	9	19
Bottle Straw	11	11	8	1	1	2	7	7	4	10	8	7	9	9	8	1	1	1	13	8	7	106
Nursing Straw	4	5	5	2	2	1	6	7	4	6	6	6	5	4	5	1	1	1	3	7	2	71
Nursing Bottle	4	3	2	2	0	3	5	6	2	4	2	3	4	2	4	1	0	0	9	6	5	47
Tongue Spoons	1	1	1	1	1	1	29	26	18	5	5	2	1	1	0	2	2	1	3	2	2	98
Tongue-tip Straws	2	2	1	0	0	0	8	8	4	2	2	1	3	3	1	0	0	0	0	0	0	37
Bubble Jars	22	25	16	2	1	2	0	0	0	11	10	8	0	0	0	2	0	1	4	4	3	100
Feather Box	19	20	16	6	7	6	1	1	0	7	5	6	0	0	0	2	0	2	3	2	1	98
Clown Board	7	7	6	3	3	3	4	4	4	3	5	5	0	0	0	2	2	2	2	3	2	60
Clown Picture	1	1	1	4	6	3	5	4	3	9	8	5	1	1	0	2	1	0	2	2	2	58
Abdominal Corset	2	8	0	1	3	0	0	0	0	0	0	0	1	1	0	1	3	0	0	0	0	20
Mandibular Sling	0	0	0	4	2	0	2	0	0	5	6	1	0	0	0	3	3	0	1	4	0	26
Mandible Stabilizer	0	0	0	2	2	0	3	4	1	3	6	1	0	0	0	1	2	0	1	0	0	25
Bean Bag	2	3	1	4	4	3	2	2	1	2	2	1	2	2	0	5	7	2	9	8	5	45
Sand Bag	3	3	0	3	4	1	1	1	0	1	1	0	2	2	0	16	29	5	5	10	2	72
Inclined Plane	9	13	5	1	1	1	0	0	0	2	2	1	0	0	0	3	2	2	5	2	3	42
Standing Board	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	2	2	1	1	2	2	17
Form Board	1	1	1	5	5	5	2	2	2	2	2	2	2	1	2	1	1	3	6	8	7	40
Picture Box	1	1	1	7	10	10	4	4	5	3	3	4	3	2	3	2	3	4	4	6	3	70
Relaxation Chair	6	6	3	5	6	4	3	3	3	3	4	3	5	4	4	23	26	19	9	9	5	130
Chair Foot Support	2	2	2	1	2	2	2	2	2	2	2	2	3	3	3	17	21	13	7	9	5	83
Individual Stdg. Table	1	2	1	3	3	3	3	3	3	2	2	2	1	1	1	5	4	3	8	11	9	43
Spirometer	3	3	3	1	0	1	1	0	0	0	0	0	1	1	1	0	0	0	3	5	2	15
Kymograph	3	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	7
Total	116	134	81	66	72	58	100	86	57	85	86	63	43	37	31	93	119	61	108	138	77	