

## Speech Therapy at the Pretoria School for Cerebral Palsy \*

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In South Africa the last 5 years have seen a growing interest in the many-sided problems of cerebral palsy. For the maximum rehabilitation of the child with cerebral palsy, the services of the paediatrician, orthopaedic surgeon, neurologist, psychologist, physiotherapist, speech therapist, occupational therapist and educationist are required; but this ideal combination is seldom attained.

The Pretoria School for Cerebral Palsy, started by parents of children afflicted with this condition, was opened in 1950, with 3 pupils and 1 therapist, and has since increased to 41 children and a staff of 3 teachers (one a nursery-school teacher), 3 physiotherapists, 1 occupational therapist, 2 speech therapists, a matron and 4 African "helps." Unfortunately the female professional staff is constantly changing and there is never a full complement. The author worked as speech therapist at this School for 21 months up to July 1954.

Only children suffering from cerebral palsy are admitted to the School, but doubtful cases are received and kept under observation for 3-6 months until the diagnosis can be established."

### TYPES OF CEREBRAL PALSY.

"Cerebral Palsy is a term used to designate any paralysis, weakness, inco-ordination or functional aberration of the motor system resulting from a pathological condition in the motor centres of the brain. The disease may be so localized as to cause only motor symptoms. More frequently, however, the brain damage is diffuse and may also cause convulsions, mental retardation, speech defects, behaviour disturbances and sensory losses of varying degrees, particularly in hearing and vision."<sup>1</sup>

During the first 3½ years of the School the following were the number and types of cerebral palsy in the children handled, and the proportion of these with speech defects:

Types	Total Number	Number with Speech Defects
Spastic	19	14
Athetoid	6	4
Flaccid	1	1
Mixed	3	2
Ataxic	4	3
Rigid	—	—
Aphasic	3	3
Unclassified	5	3
Total	41	30

Thus 11 children (i.e., 27%) have normal or adequate speech and do not require speech therapy.

Cases have to be chosen carefully as there is insufficient time to give speech therapy to all who are in need of it. Sometimes a complete lack of co-operation from the home will render therapy ineffective in spite of the intelligence of the child. In selection, younger children are given preference to older ones and the more intelligent to the more dull. It is important to spend not more than 20-minute periods daily on therapy, as the children tire easily and their span of attention is short. Individual treatment is preferred, but where 2 cases are similar in respect of age, intelligence and therapy they are taken together.

### APPROACHING THE PROBLEM.

In approaching the problem of speech therapy, each case is treated individually and a separate programme worked out for each child; there is no set line of therapy for all spastics or all athetoids. However, the therapy for spastics will involve gaining greater mobility of spastic muscles, whereas that for the athetoid group will involve gaining greater control over the affected muscles, while the ataxic case, in which the cerebellar lesion causes a loss of balance and a diminished sense of awareness of muscle feeling and placement, will to a large extent call for a kinaesthetic approach to therapy. Obviously therefore it is necessary to know the physical diagnosis before starting the speech programme; at the School it is supplied by the paediatrician, who bases it on a full history and physical examination.

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To complete the picture of the case a psychologist's report is also available. An intelligence test is done on each child. Taking into account that the standard mental testing for normal children is not wholly applicable to children with cerebral palsy—they may have speech, motor or sensory handicaps—a fair idea of the child's mental ability can be gauged from repeated I.Q. tests, and an evaluation of the child's progress and ability over a long period.

For this reason, the weekly clinical meetings at the School are an invaluable source of information about each child. At these meetings the physical, educational, and speech progress (or retrogression) is discussed by the staff, as well as the emotional adjustment of the child. The parent, too, is invited to discuss any problem and is given advice when needed. Neurological, orthopaedic and psychological changes are noted by a panel of doctors, who re-examine the child at regular intervals during the year. The home environment and the attitude of the parents to the child's physical and speech handicap are important factors to be considered in the speech treatment.

### SPEECH EVALUATION.

Speech defects in children with cerebral palsy may be directly due to the brain lesion, or they may occur, as in normal children, through other organic or functional factors. For the purposes of classification, the following terminology, adapted from Pohl<sup>2</sup> and Rutherford<sup>3</sup> is used to describe the speech defects under which the children fall.

1. **Delayed Speech.** Many children with cerebral palsy have failed to develop speech after the age when most normal children have started talking. The cause of this delay may be one of the following:

(a) Speech is an acquired skill: the normal child hears the words and sees the lip and tongue movements of the people around him. Visual or auditory impairment in a cerebral-palsy child causes him to miss these motivating cues necessary for the development of speech.

(b) Even if hearing is normal, the effort of moving spastic or athetotic articulatory muscles may be too much for the child, and he gives up the task.

(c) The child may have no need to develop speech, since all his wants are anticipated by over-protecting parents; the desire to communicate his wants is therefore stifled.

(d) Silence is a way of expressing fear and anxiety if the child feels unwanted, insecure or unloved.

(e) The child may not have been sufficiently stimulated. Kastein<sup>4</sup> states that "the child with cerebral palsy is often denied even normal stimulation. Due to his motor impairment he cannot get about to explore the world around him. Quite often, he is not spoken to, read to, or sung to, as are his non-handicapped playmates. In fact it is by no means infrequent to hear a mother say: "Why, no, I don't talk to him much, he does not seem to understand, so what's the use?" As a result the child with cerebral palsy, who in reality needs more stimulation and more experience, actually receives much less than a non-handicapped child, and sometimes none at all."

(f) The child may have an all-round slow physical and mental development. This does not necessarily indicate a low I.Q., but merely a slower rate of growth, with an accompanying slow rate of speech development.

(g) The child may be mentally retarded.

2. **Cerebral-Palsy Speech.** If the child develops speech, it may be characterized by jerky, indistinct sounds due to the organs of speech moving in an uncontrolled way. Sometimes the muscles of the tongue, lips, jaw or uvula are so spastic that movement is severely limited. Very often the speech is slow and monotonous, with a throaty or high-pitched voice, unpleasant to hear. The sounds may be so distorted as to be unintelligible to the listener.

3. **Organic or Structural Defects.** Speech defects may occur in palsied children caused by anomalies of the articulatory organs, other than those caused by the lesion of the C.N.S. Malformations such as mal-occlusion of the teeth, cleft palate, harelip and nasal obstructions are included under this category.

4. **Hard-of-Hearing Speech.** This type of speech defect is frequently found among the athetoid group. "The hearing loss is due to defect in the preceptive apparatus."<sup>2</sup> Very often it involves high-frequency sounds such as s, sh, ch, th. The child cannot hear or distinguish these sounds correctly and therefore produces them incorrectly or not at all.

5. **Stuttering.** Stuttering may occur among cerebral-palsy children, perhaps as a result of confused cerebral dominance.

6. **Voice Disorders.** Included here are differences in rate, volume, pitch and rhythm.

7. **Breathing Disorders.** Most children with cerebral-palsy have breathing disorders affect-

ing speech. Due to spasmodic or uncontrolled breathing musculature, the breath is said to be "out of phase." The child may be unable to direct the flow of air through the mouth during speech, or movement may be so inhibited as to cause shallow breathing insufficient for normal speech.

8. **Aphasia.** This defect is an impairment of linguistic function due to damage of the speech centre and associated tracts. Eisenson<sup>5</sup> states: "Those patients whose outstanding difficulties are in the comprehension of language, spoken or written, may be classified as belonging to the receptive type. Where the predominant difficulties consist of an impairment of ability in speaking, word finding, oral reading, spelling, or writing, the patient may be classified as an expressive aphasic." Very often it appears as if the child's lack of response to speech is due to deafness, but in an aphasic hearing is usually unaffected. If the child develops a certain amount of speech, sentence structure is distorted, "small" words are often left out, while writing is characterized by "mirror" formation of letters and words.

The speech defects found at the School are enumerated in the right-hand column of the table on page 13 (one child may have more than one defect).

**Speech Examination.** Before speech therapy is begun, a thorough speech examination must be made to determine the possible cause or causes of the delay or defect in the speech. The treatment will depend on these factors. The examination will include:

1. A physical examination of the speech organs to discover any structural malformation.
2. A test of the ability of the child to move tongue, lips, uvula, jaws, etc., for adequate speech performance.
3. A test of all the speech sounds in initial, medial and final positions, using pictures or objects. From this phonetic inventory omissions, distortions, and substitutions of sound during speech can be detected.
4. A crude hearing test is given and if possible an audiometer test.
5. Force and direction of the breath, as well as whether it is in co-ordination with the act of speech, are noted.
6. Sucking, chewing and swallowing acts are gauged.
7. Voice factors such as pitch and quality are noted.
8. A recording of the child's speech is taken to determine understandability and, after in-

tervals, to determine progress if any: Recordings are valuable for therapy, as they provide excellent auditory stimulation. Very often the child has no idea what his speech sounds like, and the recordings allow him to hear himself and his defects.

#### THErapy AND TECHNIQUES.

The child who, from the age 2½ years onwards has little or no speech is treated for delayed speech. At all times the child is encouraged to make sounds, to babble, to indulge in all manner of vocal play. He must be taught to watch the lips, hear the sounds and feel the placement and voice vibrations.

Speech must be a pleasurable activity as well as a necessary one. For stimulation, toys, pictures, rhymes, songs, games and dramatizations are used, depending on the age and amount of speech the child already has.

At the school there are regular singing periods apart from the speech lessons, in which the nursery group and the older groups are separately taken. The children sing and dramatize English and Afrikaans songs, and from their obvious enjoyment of the whole procedure it is clear that they are being stimulated and motivated to vocalize. In this group, too, there is a certain amount of healthy competition, and each one tries to sing well so that he or she will be chosen to be the "Matrosie," or "Little Miss Muffet."

The mother must be instructed to babble with the child, to talk, sing and read to him. While she is doing his physical exercises with him, she can rhythmically count or sing in time with the actions. Defects in the limited speech at this stage are ignored. Any attempt to vocalize or say a new word is praised.

At the same time it is important to strengthen the speech musculature. The organs of speech have a primary function other than for speech. The act of chewing and swallowing employs the same muscles as those used for speech. Therefore practice in basic functions, such as chewing, sucking and swallowing form an important part of therapy. The mother is instructed to encourage the child to eat "hard foods" and to swallow all liquids through a straw. This procedure is adopted at school, too. In this manner the muscles of speech are strengthened and drooling, so often found in cerebral-palsy children, is diminished. The "chewing-method" is successful in achieving "improvement of the functions of the mouth and speech organs, as well as of the voice."<sup>6</sup>

In delayed speech, all types of cerebral-palsy are similarly treated. In an atmosphere

of quiet, relaxation is practised, using a rag doll to illustrate floppy legs and arms, or demonstrating the difference between the feel of tense muscles and soft muscles. Later, when the development of speech is progressing, differentiation is made between the types of cerebral-palsy, so that appropriate methods of exercising can be given. Strictly speaking, though, there is not much difference in the methods adopted for spastics and athetoids.

It has been said that "there are 3 ways to treat the speech of the spastic paralytic: first, relaxation; second, relaxation; and third, relaxation."<sup>7</sup> The same may be said to apply to the treatment of athetoids. If the affected muscles can be relaxed, the spastic can be taught to move them in the desired direction, and the athetoid can learn to control them.

Whilst in a relaxed position the child is then given breathing exercises, first on his back, and later in a sitting position. The child learns the "feel" of correct breathing by gently pushing the rib cage in and out. To promote greater breath force there are many games which the child can play, such as blowing out a candle, blowing bubbles, or blowing up a balloon. Later he can combine breathing and articulation by vocalizing a sound, e.g., "ah," and at the same time seeing how far a toy aeroplane will fly—the flight lasting as long as the vocalization.

The child is also taught to direct the air through the mouth. Here again, blowing games are used, as well as exercises for improving the movements of the soft palate. The tongue is subject to a greater amount of involvement causing speech defects than any other of the articulatory organs. Tongue exercises, therefore, are given in the majority of cases. In order to encourage the child to move the tongue up, out, to the sides, or round the mouth, he is instructed to lick a lollipop by placing it in a certain position on the mouth, or outside the mouth. As a variation, a rubber mask with a movable tongue is used, and the child has to imitate its actions. The rubber "funny man" is used, too, for lip exercises to stretch the lips into a smile, to pucker them or open them into an "ah" position. With the use of games, jaw and uvula exercises are similarly given.

If the child uses certain sounds incorrectly owing to functional or organic causes, the sounds are practised, not in isolation, but in words. For this purpose scrap-books containing large pictures illustrating the particular words are used for each child. For example,

if a child substitutes "f" for "th" in his speech, large illustrations of a thumb and a thimble are pasted in to a scrap-book. Parents have to help find the pictures and the child can participate by cutting them out and pasting them in (if his physical handicap permits). Another set of cards roughly drawn by the therapist and duplicating the pictures provide many and varied games to stimulate further practice on the sound. The "feel" of the sound on the child's hand often provides the cue for correct imitation and motivation, e.g., letting the child feel the breath force as the therapist repeats an explosive consonant. All physical exercises to gain muscle strength and control, and speech sound exercises are done in front of the mirror so that the child can make use of all sensory stimuli, visual, auditory and tactile.

The treatment of aphasics is an interesting challenge to any speech therapist. It is a matter of stimulating the child through auditory, visual and kinaesthetic means until a meaningful response is elicited. One of the children at the School, a mixed type of expressive-receptive aphasia, responded dramatically to treatment: it began by the child holding a felt ball, noting its size, shape, and texture, and hearing several repetitions of the word "bal." At the same time she watched the formation of the word in the mirror. After several weeks of constant repetition, she responded by saying "bal" when she saw the ball. From then on, sentences were constructed around this word, always dramatizing the action, e.g., "skop die bal." New words were then introduced until an extensive vocabulary was built up. The results were far better for the expressive impairment than for the receptive.

In treating the hard-of-hearing child, lip-reading is taught and, together with the visual cues, kinaesthetic and a great deal of auditory stimulation is given. Earphones attached to the recording machine are an important aid to stimulate hearing. The school as yet does not possess a "train-ear." In the one case where a hearing aid has been purchased for a hard-of-hearing child, the results were disappointing; the parents could not afford a reliable set, and the child, owing to low intelligence, could not adjust herself to this apparatus. "It is urgent that all deaf cerebral-palsy children of good ability who have residual capacity to benefit from the use of hearing aid should be given auditory training from the beginning of their education."<sup>8</sup>

### RESULTS.

What is the aim of the speech therapist in dealing with these children? Evans<sup>7</sup> says, "Perfect speech is usually an impossibility... After all possible repair or help to the mechanism has been secured, aim for practicality rather than normalcy. If the speech sounds acceptable even if not high-grade, it should be accepted by the clinician and the effort praised." In judging the results of nearly 2 years' therapy, therefore, the question has not been whether the child can now speak normally but, rather, whether in the very slow process of developing or improving his speech, certain goals have been reached and maintained. For instance, can A now lift his tongue into a position to say "t"? Can B now blow out a candle directing the flow of air through the mouth? Has C stopped drooling? Is D correctly substituting "th" in words instead of "f"?

It is extremely difficult to assess the results objectively. The following is a subjective attempt to assess the children's progress at speech:

Speech	Number improved	Total in Group
Delayed Speech	7	13
Cerebral-Palsy	5	10
Organic or Structural Defects	—	1
Hard-of-hearing Speech	2	2
Stuttering	2	2
Voice Disorders	1	7
Breathing Disorders	5	15
Aphasics	3	3

### DIFFICULTIES.

The difficulties encountered in the speech therapy of children with cerebral-palsy have posed many problems, most important of which are **relaxation** and **breathing**. The therapist may spend months trying to relax a spastic or athetoid in supine or prone position only to find that there is no carry-over in a sitting or standing position, and certainly no carry-over during the act of speech. Similarly, the child may learn a form of correct silent breathing, yet during speaking it may be quite "out of phase," or entirely inadequate for speech. In other words the carry-over is often absent here too.

The therapist must query whether a spastic muscle can be completely relaxed, or whether an athetoid muscle can be controlled. Particularly during speech, when articulatory and breathing muscles are in action, how near to normal can the parts be conditioned, so that adequate speech can be achieved?

A hand-manipulated iron lung, used in the United States for teaching correct breathing,

should be tried here, as well as all the stimulating "gadgets" for motivating speech. Apparatus has been constructed which lights up or rings bells when the child says a particular word correctly.

Another important problem at the school is that of achieving an accurate assessment of the child's hearing ability. Crude hearing tests are not very reliable and the results are subjective. Tests using the pure-tone audiometer are difficult to use in a young child, since he does not know what is required of him and he tires easily. It is even more difficult to assess the accuracy of such a test when given to children of sub-normal intelligence. Varying degrees of hearing-loss seem to be relatively common among palsied children, and this aspect has been sadly neglected in examination and therapy and for record purposes.

A difficulty peculiar to South African therapist is that of language. Naturally, each child is given therapy in his home language but sometimes there is a confusion of both languages in the home and the child has this added difficulty to cope with. Also, although there is a wealth of speech sound material at hand in English, the therapist must compile all Afrikaans material from magazines, books, verse, etc. An Afrikaans phonetic speech book would be of great help to speech therapists.

The present classification of speech defects has not proved very satisfactory. Delayed speech and cerebral-palsy speech include too wide a variety of defects. Leather's recently published classification<sup>9</sup> should be of greater value for diagnostic and therapeutic purposes and to gain a more objective assessment of results.

With cerebral-palsy there is no "full understanding of the implications of the injury to the total organism."<sup>10</sup> To increase the understanding, the greatest co-operation is necessary between the speech therapist and the physiotherapist. Indeed, full co-operation is necessary among all staff members of a school to co-ordinate physical and educational methods.

### SUMMARY.

Cerebral-palsy is prolonged and difficult, and in its treatment it is necessary for workers in various fields to pool their observations and experience.

Speech therapy is one of the primary needs, communication between individuals for social and economic needs being so essential.

Experience of 41 children at the Pretoria School for Cerebral-palsy is described.

Types of cerebral-palsy and speech defects found in these children are detailed.

Methods and techniques in speech therapy are reviewed.

Results and difficulties are discussed.

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