SPEECH THERAPY AND THE BOBATH APPROACH TO CEREBRAL PALSY

Sixth Printing

MARIE C. CRICKMAY

M.A., L.C.S.T.
Speech Therapist
Gorge Road Hospital
Rehabilitation Centre
and
Veterans' Hospital
Victoria, B. C., Canada

An increasing number of people in countries throughout the world want to know and understand more about the Bobath approach. In particular they want to know more about the role of the speech therapist . . . how it can be integrated with that of physical therapist and occupational therapist. This book is an answer to the continued demand for information.

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to

Karel and Berta Bobath

PREFACE

THE Bobath approach to cerebral palsy is not a new one. It was gradually evolved by Mrs. Bobath in the course of her work with cerebral palsied children as far back as 1947. Since that time, the techniques of inhibition and facilitation of different levels of motor behaviour have been refined and developed, and this process is still continuing. Since its first inception it has been slowly gathering momentum, and an increasing number of people in different countries of the world want to know and understand more about it. In particular, there has been evidence of a growing desire to know more about the role of the speech therapist in this approach. What does she do? How does she integrate her work with that of the physical therapist and the occupational therapist? As there has been little published on this subject, the author, having been lucky enough to have studied and worked with Dr. and Mrs. Bobath, felt it incumbent on her to attempt to supply this information.

It is felt that, apart from their treatment, one of the major contributions of Dr. and Mrs. Bobath has been in helping to break down the artificial barriers which have existed for too long between the disciplines of physical therapy, occupational therapy and speech therapy. This book then is offered to all therapists in the hope that it will stimulate them to learn more about disciplines other than their own, and to seek ways of integrating their therapies. There is little doubt that the person who benefits most from this broader approach is—the patient.

A grateful acknowledgment is made to Dr. and Mrs. Bobath for their generosity in supplying material, and in particular to Mrs. Bobath for her help in relating speech to physical therapy.

Most sincere thanks are extended to Dr. Charles Van Riper, who not only insisted that this book should be written, but also gave invaluable advice and encouragement.

MARIE C. CRICKMAY

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A SURVEY OF THE PROBLEM

DURING the last ten to fifteen years the words "cerebral palsy" have gradually penetrated the consciousness of the general public. Slowly a growing number of people have become aware that among the mass of humanity a certain number of individuals are "different" from the rest. Usually they do not know the reason for this difference, but the outward signs of it are only too obvious. In the busy city streets the adult cerebral palsied victim, with his uncoordinated and precarious gait, his exaggerated arm and hand movements, and his facial grimaces, is at once apparent. Whereas in the past this condition might have aroused antipathy or even ridicule, now the average passer-by recognizes him as a sufferer from cerebral palsy and feels only sympathy. Cerebral palsied children, perhaps, may be seen driving through the streets in special buses on their way to the local Cerebral Palsy Clinic. These clinics, often started by the parents of these children, and at first supported largely by voluntary donations, are appearing in increasing numbers throughout the North American continent, in England and in Europe, for there is a growing awareness that the cerebral palsied child must, at least, be given a fair chance.

Our concern here is to discuss as fully and objectively as possible the kind of treatment that he is being given in these clinics. We need to ensure that in the light of our present knowledge and understanding of the problem of cerebral palsy, he is receiving the therapy that will best answer his needs and fulfill his latent possibilities.

When cerebral palsied children were first treated, the prob-

lem, understandably enough, was seen primarily as one calling for physical therapy. The basis of the child's disability seemed that he could not move his body in a normal way, and the physical therapist was the obvious person to deal with such a condition. Gradually it was realized that other related problems stemmed from this one basic difficulty. If, during the first year of his life, a child is unable to lift up his head, to look around, reach out for an object, to acquire hand-eye coordination, to sit up and to explore his environment by crawling, his mental development will inevitably be retarded. For in the normal child mental growth and motor development follow each other step by step. Even if his physical handicap is not sufficiently severe to retard his mental development, it is likely to restrict his field of experience sufficiently to keep him psychologically immature for his age. It came to be realized that his mental and psychological needs were as important as his physical needs. Cooper (16) expresses this belief in these words: "We often forget that we are dealing with people and not merely an aggregate of disabilities and deformities. These children have ideals and emotions like other children, and like them need a sense of self-worth and accomplishments." To help supply these needs, the occupational therapist and the speech therapist joined the physical therapist to create a rehabilitation team. The occupational therapist teaches the child the basic skills of feeding, dressing and looking after himself as far as he is physically able. The speech therapist helps him to speak. In view of the fundamental urge of human beings to communicate with each other, the work of the speech therapist inevitably assumes considerable importance. In later years, in many cerebral palsy clinics this team of three has been joined by the psychologist, the social worker, and the teacher, all working under the guidance of an orthopedic surgeon and pediatrician.

This, then is the team of workers that attempts to give the cerebral palsied child a chance to overcome his handicaps, and to live as normal a life as possible. However, before discussing the different types of therapy that are given in these clinics, it would be as well for us to clarify first, what is meant by the term "cerebral palsy," and second, to describe the physical, mental and speech characteristics of the cerebral palsied child.

WHAT IS CEREBRAL PALSY?

Abbott (1) defines this disorder as a neurological disability caused by a lesion in the motor centers of the brain. This brain damage results not only in a loss of functional muscular control, but also in sensory disturbances. Perlstein (69) believes that the term "cerebral palsy" has no specific meaning, but can be used in a general way to indicate that "some injury or damage to a person's brain has resulted in a difficulty in control of movements." Westlake (87) writes "Cerebral palsy is not a single type of neuromuscular disorder, but a group of disturbances which occur as a result of involvement of cortical or subcortical motor control areas." The Bobaths (7) describe it as a "sensorimotor disorder," and point out that it is not one condition but a group of conditions, the result of abnormal brain development or brain damage.

It can be seen that there is much general agreement in these various definitions of this disorder. The term "cerebral palsy" has come to be recognized as a general one covering a variety of specific disorders. However, these specific disorders have one characteristic in common. They are all caused by damage to the motor centres of the brain, manifesting themselves in a loss of motor control. A cerebral palsied child is just not able to move his body in a normal way. With this definition in mind, let us now discuss the different types of cases that are covered by the term "cerebral palsy."

CLASSIFICATION OF CASES

It is generally agreed that it is hard to make a clear-cut classification of cases of cerebral palsy for many of them are of a mixed character. A patient whose predominant difficulty is athetosis may, at the same time, show symptoms of spasticity. This may also occur with cases of ataxia. On the other hand, there are some cases of pure spasticity.

The manner in which spasticity or athetosis is distributed throughout the body is one means of classification. The term "monoplegia" is used to describe the spasticity or athetosis of one limb; "diplegia" the spasticity or athetosis of both upper or lower limbs; "paraplegia" the involvement of both legs; "quad-

riplegia" the involvement of all four limbs. "Hemiplegia" refers to the involvement of one side of the body, either the right or the left. In addition, Wyllie (90) suggests a classification based not only on the distribution of the disorder throughout the body, but also on its functional effects. According to his classification there are five main types of cerebral palsy. These are *"spasticity," "athetosis," "ataxia," flaccidity,"* and *"mixed types."* In this context, however, we can confine our discussion mainly to spasticity and athetosis, for the majority of cases requiring speech therapy are likely to fall into one of these two categories. In fact, Phelps (70) believes that athetoid and spastic cases make up more than 80 per cent of all cerebral palsy.

The Spastic Patient

The individual suffering from spasticity shows an increase in muscle tension, or muscle tone (the latter term will be used in the following pages) due to a lesion in the pyramidal tracts, that is, in the motor pathways leading down from the cortex, which govern voluntary movements. The Bobaths (8) state that this increase in muscle tone can vary from a mild degree to a state of decerebrate rigidity, depending on the exact site of the lesion, and the extent of the involvement of the extrapyramidal system. They continue this description of spasticity by writing, "In addition there is a loss of voluntary movements together with a return to a lower level of integration, with primitive synergic patterns of movement." This refers to the fact that in a spastic patient the normal patterns of movement are replaced by mass-reflex action of either the flexor or extensor type. For instance, if such a patient attempts to flex (that is, to bend) any one part of his body, such as his spine, arms or legs, he will be unable to do so without having his whole body flex. In the same way, if he attempts to extend, (that is, to stretch out) any one part of his body, this attempt will cause his whole body to extend. These primitive mass-reflex movements are typical of the spastic individual, and the more spastic he is, the more primitive are his patterns of posture and movement. Bobath (4) points out that fundamentally all spastic patients show the same abnormal postural patterns. For instance, if they lie in a

supine position (that is, on their backs) they all show strong extensor spasticity. They draw back their heads and shoulders, extend their hips, knees and ankles with an inward rotation, and sometimes even cross their legs. The feet are also turned inwards. The arms may be flexed at the elbows, or the arm to which the face is turned may be extended, due to the influence of the assymmetrical tonic neck reflex.

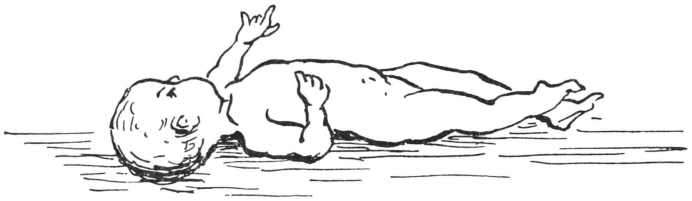

Figure 1. Spastic child lying in a supine position.

If spastic patients lie in a prone position (that is, on their stomachs) they all show strong flexor spasticity. The muscles of the neck, trunk, upper limbs and sometimes the hips, all flex, causing the spine to be rounded, the arms to be bent and often drawn in under the chest. This pattern of total flexion prevents the patient from lifting his head, extending his spine, arms and hands, and so getting onto his hands and knees. Incidentally, the spastic child very much dislikes lying in a prone position, for in it he is unable to lift his head and to move it about, or to use his arms and hands.

Figure 2. Spastic child lying in a prone position.

In classifying cerebral palsy according to both its distribution and its function, we describe spasticity that is present only in the two arms as "spastic diplegia." If it is present in all four limbs it is described as "spastic quadriplegia," and if it is in the right side of the body only it is classified as "spastic right

hemiplegia." It is generally agreed that cases of spasticity make up about 40 per cent of all cases of cerebral palsy.

The Athetoid Patient

Athetosis is the result of a lesion in the basal ganglia. Athetoid patients show the same abnormal postural patterns as the spastic patient; that is, in the supine position their mass-reflex pattern will be predominantly of the extensor type, while in the prone position it will be predominantly of the flexor type. As the Bobaths (10) point out, these patterns are "complicated by an overlay of involuntary movements." These movements appear as a series of twisting worm-like movements, progressing from proximal to distal areas in waves, that is, they originate in the parts closest to the mid-line of the body and travel outwards to the parts furthest away from it. Phelps (70) describes the movements of severe athetoids as resembling "a nonswimmer thrashing about in the water." In addition, the athetoid shows a fluctuating muscle tone varying from hypertonicity to hypotonicity, that is, from extreme muscle tension to extreme muscle flacoidity. He alternates abrupt and misdirected movements with the rigid postures of the spastic, but unlike the spastic, he only maintains these postures fleetingly. Research shows that athetoid patients make up about 40 per cent of cerebral palsy cases.

The Ataxic Patient

Ataxia is the result of a cerebellar lesion, and it shows itself in a lack of balance and coordination. The Bobaths (10) believe that pure ataxia is rarely found among cases of cerebral palsy. In pure ataxia, muscle tone is permanently subnormal, causing the movements to become very uncontrolled. However, in many cases which are often classified as "ataxic" (but which in reality show a mixture of athetosis and ataxia), the muscle tone fluctuates from hypertonicity to hypotonicity.

These then are the physical characteristics of the main types of cerebral palsy. However, in order to get a better rounded picture of the individual patient it is also necessary to discuss his mental and speech abilities.

THE INTELLIGENCE OF THE CEREBRAL PALSIED

Evans (22) makes the following plea on behalf of the victims of cerebral palsy: "It should be strongly emphasized that cerebral palsy is not necessarily accompanied by mental deficiency or feeble-mindedness. The child's face may be expressionless, and he may drool saliva—not because he is mentally deficient, but because his muscles do not perform their normal function." Evans (23) goes on to point out that since the condition is due to brain damage it is natural that if there is too much of this injury the intelligence will be affected, this being particularly the case if the damage is in the cortex. According to his estimates 50 per cent of cerebral palsied individuals are of average intelligence, 5 to 10 per cent are exceptionally bright, 10 per cent are low grade morons, and the rest are borderline cases. Van Riper (82) states that research has shown that only about 30 per cent of cerebral palsied children are feeble-minded, and that the other 70 per cent may range all the way upward to genius level. In other words, this latter group represents a normal cross section of humanity. It is, however, extremely hard to measure a cerebral palsied child's intelligence, for the usual tests call either for some speech, or some degree of muscular coordination which is often beyond his capacity. Bobath (4) makes the point that it is particularly hard to assess the intelligence of a severely handicapped child "whose inability to respond is not necessarily due to a lack of inate intelligence, but is due in many cases to the persistence, in abnormal strength, of primitive patterns of posture and movement, which prevent more mature motor responses from making their appearance." It would be impossible for such a severely handicapped child, no matter how inately intelligent he might be, to show the same rate of mental growth and development as the normal child.

We now have a general picture of the range of intelligence of the cerebral palsied child. It is hard to over-emphasize the importance of his inate mental abilities for they will largely determine his response to therapy. This is particularly the case if he has speech problems. A severely handicapped cerebral palsied child with a low intelligence quotient may be quite unable to

acquire speech, whereas a child with a similar physical handicap, but with an inately high intelligence is more likely to overcome his difficulties and learn to speak. In this connection it is interesting to note that in working with cerebral palsied children, Hood, Shank and Williamson (43) point to the imperfect relationship that exists between the severity of the affliction and the adequacy of speech and other motor skills. Carlson (13) also observes "I realized that the severity of the physical handicap was a poor criterion of the spastic's fate, and that a study of his behaviour in relation to the structural brain defect gave a much better idea of the prospect of helping him." In other words, in working with cerebral palsied individuals therapists must not judge the patient entirely by his physical handicaps, for his innate intelligence, and the environmental factors (which will be discussed later on) are at least of equal importance. With this concept in mind, let us now discuss the cerebral palsied patient from the point of view of his speech.

THE SPEECH OF THE CEREBRAL PALSIED

Approximately 65 per cent of cerebral palsy cases have some degree of speech difficulties varying all the way from slight articulatory errors to a total inability to move the speech organs sufficiently to say any intelligible words. In an attempt to study the possible distribution of these speech problems Hopkins, Bice and Colton (44) checked 1,293 cerebral palsy children. Of these they found that 64.9 per cent were quadriplegics, and that most of the speech problems were confined to this group. (It is interesting to note that this is borne out by Hoberman and Hoberman (41) who observe that many hemiplegic and diplegic children have essentially normal speech.) In this same study it was also found that 13 per cent of the children had hearing losses and 27.7 per cent had defective vision.

As could be expected, the type of speech difficulty is largely determined by the particular type of cerebral palsy. For instance, the spastic patient, with his excessive muscular tension and his sudden spasms, tends to produce speech that is explosive and punctuated by long pauses. This is what is usually referred to as "cerebral palsy" speech. In cases where there is severe speech

involvement the spastic may become completly "blocked", and unable to move his speech mechanism. The athetoid patient with his overlay of involuntary movements produces speech that is extremely variable. Mild cases may show only slight articulatory errors, while severe ones may be unable to speak at all. Hoberman and Hoberman (41) observe that lack of head control, inability to swallow, with resultant drooling, add to the speech problems of athetoids. Van Riper (82) notes that in cases where there are symptoms of both spasticity and athetosis the articulation is apt to be more distorted than if spasticity alone is present. The ataxic patient produces speech that is uncoordinated, slurred and lacking in rhythm.

A great deal of research has been carried out on the differences between the speech of spastic and athetoid patients. Wolfe (89), in a study of fifty cases of cerebral palsy, related one of his tests to the "understandability" of the speech. He used this term to refer to intelligibility—how well the meaning of the passage spoken could be understood by the listener. As a result of this test, he found that 40 per cent of the athetoids could not be understood, whereas 72 per cent of the spastics had some degree of intelligible speech. Wolfe explains that these results are not altogether surprising since in a prior examination of the subjects' speech mechanism (consisting of an examination of the tongue, lips, mandible, velum, larynx and respiration) it had been found that 100 per cent of the athetoid subjects had an involvement of each organ examined, with consequent inadequate articulation. The spastic group, on the other hand, had the smallest percentage of subjects with involvement of the different speech organs, and the largest percentage of subjects having normal speech.

Research on the differences in pitch between athetoid and spastic patients has not always produced agreement. Some have found that the pitch of a spastic's speech is higher than an athetoid's," while others have found the reverse. However, many investigators, such as Duffey (20), Leith and Steer (56), and Clement and Twitchell (15) are agreed that athetoids show greater deviations, with sudden and uncontrolled changes of pitch, than spastics. Irwin (50) in a study of the mastery of

speech sounds finds that there is no strong statistical evidence that differences exist between the two groups, and Byrne (12) also finds no significant differences.

These somewhat conflicting results point to the extreme difficulty of making a detailed assessment of the cerebral palsied child's speech. Indeed, it is often impossible because his speech, or lack of it, is not constant. It varies continually with the degree of his spasticity at any given moment, which itself is partly controlled by the position of his body in space at that particular moment, and partly by the amount of stimulation he is receiving from his environment. These factors are, of course, extremely variable, so that at one moment a certain speech characteristic is evident, while at the next it has disappeared and its place is taken by another. This bears out the Bobaths' belief that in working with the cerebral palsied it is necessary to see their problem in its totality, and not to isolate any one part of it. If, for instance, we attempt to isolate the speech and examine it independently of his general motor behaviour we cannot get a true picture of his speech problem. We need to view his speech behaviour in relation to the abnormal motor behaviour of the rest of his body.

We have given a brief clinical picture of the physical, mental and speech characteristics of the cerebral palsied child. Now let us consider some of the different types of therapy he is given in the many different clinics of the world. Some of these therapies are "older" and some are "newer" and, as we shall see, they have a few similarities and a few important differences. These are some of the better known.

Phelps' Muscle Re-education

Phelps was possibly the first to bring the plight of the cerebral palsied into the open. He framed the term "cerebral palsy," which is now universally accepted, and through his pioneer work in this field created a greater awareness of this problem. In all probability, many clinics throughout the world are still following his method of treatment. This is based on a detailed analysis of the muscle function of the cerebral palsied patient. Individual muscles are tested, and a careful inventory

made as to whether they are spastic, flaccid, rigid or normal. Progress in treatment is assessed in terms of improvement of function of the individual muscles. In a description of his method, Abbott (1) observes that the physical therapist and the occupational therapist work closely together, in that the latter translates the control "learned in physical therapy into active feeding and dressing skills."

The Resistance Technique

In this type of therapy, associated with Kabat and Knott (54), proprioceptive stimuli are used for the development of movements which approximate the normal. These stimuli, consisting of stretch, maximal resistance and pressure, are given manually by the therapist as a means of stimulating the motor cortex. The therapy is based on the belief that these stimuli produce the maximal activation of the entire motor pathway. If weakness is apparent in both the flexor and extensor muscles, both are given heavy resistance, particularly the weaker of the two. This technique is carried out first in simple motions and then in more complicated ones, with the resistance being continually reduced. It is also applied in speech therapy. Hoberman and Hoberman (41) describe its use in strengthening the tongue protrusion and elevation. "The clinician may grasp the tongue with a piece of gauze and push back and downward . . . then the patient is instructed to push his tongue out and up as the clinician resists this movement." This method can also be used in the correction of faulty breathing patterns.

Treatment by Relaxation

The spastic and athetoid patients with their abnormally high muscle tone, sudden spasms and uncontrollable involuntary movements are obvious candidates for relaxation, and many attempts have been made to use it therapeutically. Jacobson's (51) method of progressive relaxation is probably the best known. Here relaxation is produced first by inducing its opposite, contraction, and then gradually training the patient to achieve a conscious relaxation of his muscles and muscle groups. Relaxation therapy is always carried out under favourable environ-

mental conditions, with all stimulation reduced to the minimum. Passive relaxation techniques are sometimes used with the therapist making the movements for the patient. It is often used in speech therapy. In fact, Evans (23) writes: "Someone has said that there are three ways to treat the speech of the spastic paralytic: firstly, relaxation; secondly, relaxation, and thirdly, *relaxation.*" He agrees that this is not too easy to achieve, but notes that the best method that he has found is an adaptation of an East Indian system. In this system the clinician refers to various muscle groups, and describes a state of passivity in each of them as the patient concentrates on creating that condition.

The "Brushing" Technique

Rood (73) has developed a therapeutic technique to provide proprioceptive stimulus for the establishment of more normal motor patterns of behaviour. In the field of speech therapy she advocates a gentle stroking (either with the finger or a small dry paint brush) of the tongue or velum, in order to stimulate these areas to respond more adequately. This same technique is applied to physical therapy.

The Bobath Approach

This approach is based on the belief that, owing to the brain damage the inhibitory control, normally exerted by the higher centres of the central nervous system, fails to develop. Depending on the exact site of the lesion the cerebral palsied child will show analagous primitive reflex patterns of posture and movement. But, whereas, in normal development primitive reflexes, through the increasing use of inhibition, are broken up, elaborated and resynthetized into more mature motor patterns (increasingly under voluntary control), in the cerebral palsied child they remain constant and static, completely dominating his motor behaviour. For example, if he lies in a supine position his neck, shoulders, spine, hips, legs and feet will automatically extend, while his arms flex; and this reflex pattern of movement is so strong that he is unable to move out of it. If he lies in a prone position his neck, shoulders, arms, spine and possibly his hips will automatically flex, and again he is trapped in this one position, and unable to move.

Bobath therapy, as Mysak (64) points out "is fundamentally a tactile-proprioceptive approach designed to actualize the frequently unmanifested, but potentially present, higher motor mechanisms." Believing that it is possible to influence the central nervous system externally, the *first* aim of the treatment is to handle the cerebral palsied patient in such a way that his abnormal muscle tone becomes normalized for, as the Bobaths (10) note "muscle tone of moderate intensity forms the background against which normal movement takes place." By various means, which will be discussed later on, the abnormally high muscle tone of the spastic is reduced, while the fluctuating tone of the athetoid and ataxic patient is stabilized. The *second* aim of therapy is to inhibit the primitive reflex patterns of motor behaviour shown by the patient. Since he is unable to do this for himself, initially the therapist carries out this inhibition for him, but as soon as possible he takes over the control for himself. The *third* aim of the therapy is to facilitate the next step in the normal motor developmental process. Again, in the initial stage the therapist facilitates the more mature movement, but the patient slowly acquires the ability to perform the movement for himself. In this approach occupational and speech therapy are based on exactly the same principles as the physical therapy, and all three therapists work in close cooperation. We will be discussing the work of all three in greater detail in later pages.

SIMILARITIES IN THE THERAPIES

Similarities in the treatment of cerebral palsy can be found more easily among the "newer" therapies than between the newer and the older and more conventional methods of treatment. This can be attributed to the fact that the concepts underlying these newer therapies appear to have greater homogeneity than before. These concepts are based on a recognition that in cerebral palsy the brain lesion has caused neurological deficits which result in abnormal neuromuscular patterns of movement. There are also greater similarities in the methods of treatment among the newer therapies. More attention is being paid to the teaching of patterns of posture and movements rather than to the exercising of muscles and joints. In addition, as Bobath (4) observes: "The