

THE BOBATHS' APPROACH TO CEREBRAL PALSY HABILITATION —A REVIEW

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The Bobaths' method of treatment (Bobath and Bobath 1955,1959) of cerebral palsy is one of physiological rehabilitation and is based upon resistance to primitive reflex patterns that children with this problem tend to exhibit. Their approach differs from other approaches currently practiced and is based on the premise that the fundamental disturbance in the motor behaviour of the cerebral palsied child is his inability to inhibit control over basic postural reflexes. Their treatment enables the patient to achieve control over the larger muscular movements required for moving his body, which the Bobaths feel, is a prerequisite for gaining control over the finer movements required for speech.

In cerebral palsy, lesion interferes with the normal development of the central nervous system and thereby causes infantile spinal and brain stem levels to dominate the central nervous system. This results in the patient exhibiting postures, movements and muscle tone associated with the spinal and brain stem reflexes and these reflexes interfere with the development of mid brain and cortically integrated patterns.

In normal children, reflexes and motor skills follow definite developmental sequence. With maturation of the central nervous system more complex movements appear, and there is a gradual shift from spinal level integration to integration at the cortical level. In cerebral palsied children however, motor patterns do not appear in their proper sequence as the sensory-motor pathways are not intact.

Some Spinal and Tonic Reflexes that Interfere with the Child's Motor Behaviour

Spinal reflexes may be elicited in normal children up to 2 months.

The Flexor Withdrawal Reflex: A child with a predominately extensor pattern would be flexed at all major points. He is unable to flex a limb selectively in any one joint. If the child is lying prone and tries to bend his knee, he can do so only by simultaneously raising his hip in flexion. When lying supine, he will not be able to dorsiflex his ankle with an extended lower limb.

The Extensor Thrust: This consists of extension of the flexed stimulated limb.

The Crossed Extensor Reflex: It is a combination of the flexor withdrawal and extensor thrust reflexes and is characterized by the extension of the flexed

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limb upon flexion of the contralateral limb. This pattern can often be seen in athetoid children, while in spastics it is inhibited by extensor spasticity of both legs which prevents alternating kicking. It can be seen in spastics when walking, demonstrating an increase of extensor spasticity in the standing leg while the other leg is flexed to make a step.

One of the primitive reflexes which has a serious effect on the motor behaviour of the cerebral palsied child is the tonic neck reflex. A brief description of the brain stem reflexes follows.

Tonic Labyrinthine Reflex: It is characterized by maximal extensor tone throughout the body in the supine position and maximal flexor tone throughout the body in the prone position. The extensor spasticity prevents the child from raising his head and sitting up. He cannot move his arms forward to grasp and support and pull himself up to a sitting position.

When lying prone, the child shows flexor spasticity. His head and spine are flexed, shoulders are pulled forward and down, and arms caught under the body in flexion with hands fisted. Hips and knees are often flexed but if the hips are extended the knees are usually extended as well, thus rendering it impossible for him to get himself up to the kneeling position.

Asymmetrical Tonic Neck Reflex: It is a proprioceptive reflex characterized by maximal extensor tone in the arm and leg on the opposite side. Effect is more clearly seen in the arms than in the legs. This reflex may prevent the child from grasping an object while looking at it. In order to pick up an object the child has to turn his head away from it which prevents eye hand co-ordination. He cannot bring his fore-fingers to his mouth, as bending the elbow is possible only when head is turned away from it.

Symmetrical Tonic Neck Reflex: This is also a proprioceptive reflex, characterized by extension of the arms and flexion of the legs when the head is raised, and flexion of the arms and extension of the legs when head is lowered. Children in whom the symmetrical tonic neck reflex is stronger than the tonic labyrinthine reflex will find it impossible to crawl on hands and knees, for flexion of the head in the crawling position will result in corresponding flexion of arms and extension of legs.

Positive Supporting Reaction: This is characterized by simultaneous contraction of flexors and extensors upon (1) contact of the balls of the feet with the ground (2) which causes stretching the intrinsic muscles of the foot. As a result, muscle tone increases in both the extensor and flexor group of muscles of the leg and the leg stiffens.

Negative Supporting Reactions: This is characterized by reflex relaxation of the extensors of the proximal joints upon cessation of stimulation of the pads of the feet.

Associated Reactions: Characterized by widespread increase of spasticity in parts of the body upon a willed movement in another part of the body.

These reactions may be elicited in normal infants from up to six months of age. Central nervous system development to only the brain stems level would not allow the child to assume a quadrupedal crawling position.

The persistence of tonic neck reflex is recognized as a deterrent to locomotor training. Spasticity seems to be the direct result of the release of the tonic reflex activity of the brain stem. The degree of spasticity seems to be directly related to the strength of the tonic reflexes.

A knowledge of the individual reflexes is a great help in analysing the motor behaviour of children with cerebral palsy and in recognizing the influence of each postural reflex on the child's postures and movements.

The mid brain integrated righting reflexes are important for rolling, sitting, crawling and standing. Many of the cerebral palsied children have difficulty in developing these reflexes. The equilibrium reactions represent the highest level of reflex maturation and these persist throughout life. In cerebral palsied children, the lower levels persist, and the equilibrium reactions are either absent or are poorly developed. Their motor action is limited to the persistent spinal and tonic reflexes and perhaps to some primitive righting reactions.

In a normal child, sensory stimuli reach the central nervous system through the proprioceptors. The baby's first automatic movements, the righting and equilibrium reactions are mediated by the proprioceptive system which lays down the sensory patterns of voluntary movements and skills. In the case of a cerebral palsied child, the proprioceptive system mediates only sensations which are abnormal and with these sensory experiences it is not possible for him to develop normal movement patterns and postures.

A thorough knowledge of the basic reflexes and the principles underlying the treatment is very essential for successful treatment. In following this approach, it is necessary that the physical therapist and speech therapist work in close co-operation. These therapists need special training, to enable them to recognize the reflex patterns which are integrated at the various levels of the central nervous system. They must know the normal sequences of reflex development and how to inhibit tonic reflexes. Permanent inhibition of tonic reflexes is achieved by developing righting and equilibrium reactions, and it is essential that the physical therapists know how to facilitate righting and equilibrium reactions in their proper developmental sequences.

Most of the conventional methods of treatment do not take into consideration the developmental sequences of motor skills and the Bobaths feel that this is one of the reasons why some children develop contractions and deformities. In Bobaths treatment, diagnosis is done in terms of reflex postures, and the subsequent level of response determines modalities of treatment. Their treatment plan is to inhibit pathologic tonic reflexes through teaching inhibiting control which leads to breaking up of abnormal reflexes. Motor tests are made use of for diagnosis and for assessing the severity of the involvement. Abnormal postures

and movements are studied and muscle tone determined. This analysis indicates the child's level of nervous system development.

On the basis of this analysis appropriate inhibiting postures are planned. These postures are called 'Reflex Inhibition Postures' or 'RIPS'. This involves abnormal posture reversals—changing the flexion to extension, pronation to supination and abduction to adduction, etc. These changes are imposed on the patients by the therapist at the various joints, necks, and shoulders; spine and hips being the most important. This special positioning serves to reduce tone which is of paramount importance in spasticity and also permits a higher integration of sensory inflow.

Postures are introduced in proper developmental sequences and are applied according to individual reflex patterns. For example, a child with a predominantly extensor pattern would be flexed at all major points.

An attempt to disturb this sensory motor pattern is made by mismatching motor out flow and sensory feed back patterns, i.e., the clinician modifies the flexor—adductor—inward rotation muscle patterns to extensor—abductor—outward rotation muscle patterns and thereby feeds back an incongruent sensory pattern into the CNS' (Mysak 1963).

In the early stages, patients will find it very difficult to maintain these postures even for very short periods of time and they will struggle hard to get released from the 'rip'. But as therapy progresses they will be able to maintain these postures for longer periods and with greater ease.

After a child has been placed in a number of inhibiting postures, he should be able to perform a certain movement, connecting the various postures that he has learned, which make this particular movement possible. Though in the early stages the child is able to experience normal muscle tone for only short intervals of time, as therapy proceeds, he is able to experience it for longer periods and thereby benefit from the normal sensations from muscles and joints.

Using this procedure the therapist paves the way for higher center integration of sensory inflow and at the same time indirectly facilitates the emergence of higher integrated righting reflexes, which enable a child to turn over from supine to prone, to get on to his hands and knees and to sit.

'By the effective use of this procedure the clinician succeeds in imposing a sensory feedback pattern which is more appropriate to higher centre sensorimotor integration and he hopes that if these centres are reasonably intact, they may begin to respond'. (Mysak 1965,p 163).

They encourage these automatic movement patterns only indirectly by placing a patient into positions which require automatic adjustments of posture and movements. The Bobaths call those 'facilitating' movements, as these automatic movements are not taught to the patients.

The child is gradually taken to a stage where he is able to inhibit his own reflex behaviour. The Bobaths feel that development of motor control should proceed

in the same lines as in the case of a normal child, and that no stage must be skipped. That is, motor control on one level must be acquired before control on a higher level can emerge. A child to be able to sit and stand, should go through the earlier stages of development.

Establishment of higher center sensori-motor integration is accomplished by repetition of activity. As therapy progresses, the child's movements become refined, and he is able to imitate the old reflex patterns without losing control and without the accompaniment of the old muscle spasm. He becomes more confident, ability to resist pressure increases, and is better able to adjust to new postures and movements.

Bobaths methods as applied to speech

The rationale for the general Bobaths' therapy approach also applies to specific respiratory-phonatory-articulatory procedures. The speech therapist must be aware of the child's general level of central nervous system development before he can plan his therapy goals effectively. He must know how to use 'rips' when developing articulatory movements. The cerebral palsied child lacks inhibitory control and whenever the child attempts to make isolated movements of jaw or tongue, there is an increase of muscle tone throughout the whole body. The Bobaths believe that speech rehabilitation is largely dependent on physical rehabilitation and that finer movements required for speech is possible only after gaining control over the larger muscular movements required for moving the whole body. If speech therapy is administered without bearing this in mind, any improvement in articulation will be only at the cost of increased abnormality of motor behaviour. The Bobaths stress the importance of not beginning speech therapy until the child has succeeded in maintaining at least one or two reflex inhibitory postures with ease. When speech therapy begins, it is administered in conjunction with physiotherapy. 'RIPS' which allow more normal respiratory phonatory—articulatory muscle tone are attempted and the postures are imposed in supine, sitting, and standing positings, depending on the child's level of neurophysiological maturation.

The first step is to find out whether the child can move his articulators independently of his head and neck, or part of his body associated with the speech mechanism without moving the rest of the body.

The aim of therapy is to facilitate differentiation of the speech mechanism by positioning the individual by appropriate inhibiting postures and moving the head through various positions. In the final stage the child is encouraged to move his head freely while the shoulders are held down. This procedure enables some children to babble spontaneously.

Following head and neck differentiations the next step is to work towards differentiation of the articulators from head and neck. The child achieves speech mechanism differentiation when he is able to move his head in various positions

independently from the rest of the body and also his articulators independently of his head and neck.

Retained infantile oral reflexes may be the major cause of the child's articulation disorder in some cases. The therapist's main aim is to suppress these infantile oral reflexes by providing the adequate stimulus and aborting the expected response. For example, if on touching the upper and lower gums the jaw deviates to the side stimulated, it is a reflex action and should be suppressed; or if on stimulating the lower lip, the jaw opens, this again is a reflex action and should be prevented.

Desensitization of the various parts of the speech mechanism helps manipulation of the articulators without the occurrence of spasm, and permit spontaneous speech and voicing. After the therapist has succeeded in breaking up the reflex patterns of movements thus allowing isolated movements of the speech mechanism, he proceeds in the direction of facilitating phonation. For this the Bobaths suggest placing the child in a supine position and vibrating the chest or under his chin, the therapist vocalizing at the same time. He may vocalize a vowel sound encouraging the child to follow suit. By using motor kinesthetic techniques, the therapist facilitates the desired articulatory movements and thus causes the child to duplicate his sound production. Some of the usual postures used by Bobaths for facilitation are (1) supine with flexed abducted knees, shoulders flexed and raised forward on the therapist's arms and head falling back, (2) kneel sitting with trunk forward and head down between extended arms.

For improved breathing, placing the child in a supine posture and rolling the knees and the lower part of the spine from side to side is suggested by Crickmay (1955).

Once the child has reached a stage when he can sustain phonation, the next step is to work on production of sounds through the use of facilitated babbling. They suggest different reflex inhibiting postures to teach different consonant sounds and this eventually carries him to a stage where he can produce the sounds in any position. They follow the normal developmental patterns and take the child through all the stages of speech development. Facilitated babbling is followed by spontaneous babbling which in turn is followed by words and phrases.

Mysak (1963) has described the rationale and techniques underlying reflex inhibition therapy, and has reported the successful and beneficial results on speech—changes in oral reflexes, differences in breathing pattern during speech activities with changes in speech, articulation and voice quality—following reflex therapy.

Summary and Conclusions

The Bobaths method of treating the cerebral palsied children was described. Treatment in this method is mainly on neurological lines, the aim being to inhibit abnormal reflex activity and facilitate normal automatic reactions. The patterns of tonic reflexes are broken up by using reflex inhibition postures. Higher integrated normal postural reactions are

activated to obtain permanent reduction of muscle tone and inhibition of intermittent muscle spasm. These are facilitated in their proper developmental sequences by using special methods of handling the child. Once the normal basic motor patterns are firmly established they in their turn modify and weaken the reflex patterns and keep them permanently in check. In this treatment physical therapy and speech therapy go hand in hand.

In the past several years, research activities on Cerebral Palsy have been accelerated, but even then much still remains to be investigated. More controlled research on almost every aspect of Cerebral Palsy including the nature and functioning of the sensory and neurophysiological structures, its role in personality manifestations, its related psychomotor ramifications etc., is desperately needed. As research resolve some questions, many others will arise. With greater understanding of the problem will come more successful methods of handling, educating and minimizing the effect of the motor disability whenever possible.

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