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CONDUCTIVE EDUCATION

Introduction

Conductive Education is an educational system that has been specifically developed for children and adults who have motor disorders of neurological origin. It is based on the premise that a person who has a motor disorder does not only have a medical condition requiring treatment, but very importantly a problem in learning that requires education. During the past two decades, Conductive Education, increasingly known simply by its initials, CE, has emerged as a potent and dynamic force that benefits children and adults who have difficulties in controlling their movements (motor disorders). The spread of CE throughout the world, has, in large part been due to the determined advocacy of families who have lost confidence in already existing systems of treatment. These families strongly regard CE as a potentially effective response to their needs. Because of the successes of and interest in Conductive Education, other scholars have begun to examine the CE approach (Sutton,1999).

Origins of Conductive Education

Conductive education's origin lies in the works of '"Professor András Pető"'. Peto was born in Hungary in 1893. After primary school he attended grammar school then he was sent to Vienna to study liberal arts but for reasons unknown to us he chose medicine as his career. In his curriculum vitae he stated simply that he earned his medical degree in 1921.The colorful and teeming intellectual atmosphere of Vienna made a great impression on Peto. During that time, Vienna was the meeting place of European intellectuals and home to professional workshops. Peto met and befriended Jacob L. Moreno, a well known figure of Freudian thinking. In addition to being a psychiater and independent and holistic thinker, Moreno was also the founder of psychodrama. He paid special attention to "commedia dell'arte", the Italian improvised comedy. The corner stone of this genre is that there are as many variations to the story as there are performances. Moreno, together with Peto started working with children. The children performed improvisations in which their own experiences and conflicts were played out and experienced again. Moreno believed that play taught and enabled a person to handle their problems. He felt that functional disorder is built up not only of verbal(cognitive elements) but it has behavioral, (affective) and other components too (Forrai 1999). After Moreno, later on, Peto introduced spontaneity into the lives of his patients as part of their play.

Between 1930-1938, Peto published many literary, philosophical and medical writings. He was the editor-in-chief of the periodical Biologische Heilkunst (Biological Healing) (Forrai, 1999).

After the Anschluss–the political union of Germany and Austria in 1938- Andras Peto went to Budapest. He was in Hungary almost a year –during the long period under German occupation, from March 1944, at the Children's Home of the International Red Cross in Budapest.Since Peto did not want to wear the compulsory yellow star, which stigmatized and separated Jewish people from others, he never left the home. It was in this children's home that Peto started to work with sick, disabled and motor disordered children, using elements of movement therapy, which he had already successfully used in pneumological and psychiatric institutions (Forrai, 1999). In this role he worked with residential children believed to be incurable. After one year however, a commission reported that the condition of the children had improved remarkably. The news spread and Peto began to treat

children on an outpatient basis as well those in the institution. Peto did not have trained staff during that time and as a result he cooperated with Gusztav Barczi, a decisive figure in Hungarian special education and the director of the Special Needs Training College. Peto worked as a lecturer at the training college and his students worked alongside him at the children's home. The number of children with motor disorders increased enormously in 1954-55 due to the Heine-Medin epidemic. Conventional medical science failed, which left only Peto and his method. The hopeless cases were given to him as a kind of experiment.
His Institute, the National Institute of Motor Therapy, officially opened in 1952 and generated more and more interest at home and abroad. Peto constantly improved his methodology. Instead of following the medical model of providing different therapies, Peto created a framework for an educational model in which children with disabilities could have an education that met their particular physical and intellectual needs. Unfortunately his concentration on practical work meant that he created no extensive corpus of published material. For a long time the unified and complex program was regarded as experimental but since so little was written about his approach the program was beyond comprehension and resistance occurred. After a long and bitter struggle with the Hungarian Special Education System in 1963, the Hungarian Government recognized Conductive Education as an effective educational program for children with motor disorders. The Government created an Act which delegated the primary responsibility of rehabilitation of children with motor disorders to Conductive Education. This event, which marked a new period in the development and expansion of conductive education was the introduction of training for specialist teachers-conductors-in 1968. Conductive Education's origin lies in the works of Professor András Pető.

Definition of Cerebral Palsy

In order to understand the nature of Conductive Education, it is important to highlight the different interpretations of cerebral palsy. Throughout decades, the term cerebral palsy has been defined in many ways, which is a clear indication of how difficult it has been to precisely designate this condition. The early descriptions left no doubt that it was not a disease, but rather a series of motor disorders (Scherzer, 1982). The traditional medical orientation considers cerebral palsy to be a group of conditions characterized by motor dysfunction and various associated problems which result from non-progressive prenatal, perinatal, or postnatal brain damage (Bax, 1981; Bleck, 1987). Researchers have pointed out how problematic this definition is. Carrasco(1989) maintains that it does not truly reflect the complexity of the condition because it does not relate to the functional effects of cerebral palsy. Hari and Akos (1988) have suggested that motor disorders should not be considered as simply damage to the function of motor systems themselves, but rather dysfunctions that affect the entire personality's adaptive activities. McDonald (1987) claims that the term "cerebral palsy" is misleading, since damage may occur in areas of the brain outside the cerebrum and that the term "palsy" does not accurately reflect the clinical picture of cerebral palsy. Levitt (1982) adds that since the damage occurs in the developing nervous system, the clinical picture is not a complex of static symptoms. While the damage itself is not progressive, it has various and fluctuating manifestations throughout the maturation of the nervous system, and pathological symptoms which may develop later (Levitt,1982). Cogher (1982), another adherent to this position, contends that defining cerebral palsy as non-progressive brain damage is not only inexact but also misleading. Carrasco (1989), in his attempt to overcome the limitations of existing definitions, suggests combining elements from Bax (1981) and Bobath (1980), and defines cerebral palsy as a movement and stabilization disorder caused by non-progressive prenatal, perinatal, or postnatal brain trauma and is manifested by various muscle coordination and sensory disorders.

Traditional treatment for children with Cerebral Palsy

Cerebral Palsy in most countries had been considered as Cerebral Palsy|a non progressive chronic motor disorder (Ludwig, 2000) with related syndromes, such as speech language problems, cortical visual impairment and cognitive issues. Therefore the treatment of motor disorders was also medical. The different problems were treated by different professionals from various disciplines, that include special needs teachers, doctors, nurses, psychologists, social workers, speech-language therapists, occupational therapists and physiotherapists. Each professional had a general background in their own discipline(Hedges,1988).

As the child with cerebral palsy approached school age, the emphasis on therapy shifted away from motor development. Efforts now focused on preparing the child for the classroom and providing access to the curriculum. Each area of need within the individual is still treated by specialists who have the particular knowledge and therapeutic 'toolboxes'. In summary, multidisciplinary approach was based on the assumption that the Cerebral Palsied child's communication, academic learning, functional learning and physical training can and have to be dealt with by relevant specialists.

Cerebral Palsy as learning disorder

Conductive Education not only provides a different viewpoint about the nature of Cerebral Palsy but it recommends a different solution as well. The fundamental breakthrough in principle provided by Peto was his view that motor disorders should be perceived as learning problems (Hari and Tillemans, 1984). Petö argued that even though the primary problem of the child with Cerebral Palsy is physical, their inability to function could be attributed, first of all, to a psychological problem, i.e., to a learning difficulty that develops on a secondary level. While the original brain damage may be non progressive, its effect upon all areas of development may be constantly changing and can result in, as Peto stated, a generalized dysfunction. Peto considered that a motor disordered child, after brain injury, is still actively attempting to solve problems arising from tasks in the environment. At the physical level, it is found that the loss of certain neural tissues does not limit the attempt of the remaining tissues to compensate for the loss.

Experimentation in support of this idea includes Taub's study (1980) on the deafferentation of a limb in monkeys which started to use the deafferented limb again for functional activities once his intact limb was restrained. This illustrates that non¬use of the limb does not occur because of the neural deficit but rather because of a learned compensation for the deficit (Tsang,1990).The above can account for the exhibition of various nonfunctional and stereotyped motor patterns in a child with a motor disorder. Peto did not regard dysfunction as a feature of such children, but the product of the interaction between the child and his environment (Hari and Tillemans, 1984). Peto claimed that dysfunction is a change in coordination, which can be viewed separately from any deficiency. Peto asserted that dysfunction is not static or localized and it affects the whole personality of the child with cerebral palsy. He was not concerned about the injury of the central nervous system. His concerns and interest were to alter the integrating function of the nervous system responsible for the organization of a wide variety of functions and which, due to the injury, had become disintegrated. The dysfunction of the child is not the maladaptive movement pattern itself, but, as Peto stated the result of an interrupted learning process. The difficulties inherent in adapting to the requirements of an activity leave the child unmotivated to continue the problem-solving skill process. The child then learns to be dependent. One can see that the effect of a lack of motivation is not limited to the

physical level, but extends to the psychosocial level, impeding the child's development as a whole (Kwan 1990). In other words, as individuals, we face greater and greater challenges that require more and more skills. Motor disorder can have a devastating effect upon the ability to meet these challenges and to learn the necessary skills. Peto considered dysfunction as a certain organizational characteristic of an individual. It is not a well defined malfunction or symptom or condition. It's manifestation is that the individual wants or should do something but he is unable to do it, not because he is incapable of doing it but because he does not know how to do it (Hari, 1990). Therefore Peto, argued, while the origin of Cerebral Palsy is medical, the consequences interrupt the general learning ability of the individual. Peto instead of thinking in therapy and adaptation, suggested that by applying an appropriate educational approach the individual could learn to overcome the consequences of the motor disorder.

THE ULTIMATE GOAL AND KEY PRINCIPLES OF CONDUCTIVE EDUCATION

Based on his concept about dysfunction, Peto's, ultimate goal and major rehabilitative objective was to restore the interrupted learning process using a holistic educational approach while integrating the individual into the educational setting or society where he or she belongs. Peto's system is based on the notion that education should not distinguish between the learning mechanism, the neuro-physiological basis of motivation, or the regularity of the learning process. Rather, education is concerned with the conditions that enable the objectives of teaching, education and rehabilitation to be successfully attained (Hari, 1975). Therefore children with Cerebral Palsy must actively and consciously learn every skill, including motor, cognitive, self-help and social skills that are spontaneously learned by typically developing children through maturation and stimulation. This can be done under two conditions:

1. **By presenting functional tasks, which involve real, concrete demands and require the brain to find solutions.**
2. **By presenting environmental and psychological conditions conducive to this learning process This means that through meaningful activities the child will learn new ways of approaching challenges s/he face in everyday life.**

Key principles of CE

A) The child is a unified whole. The detrimental effects of a brain injury impede the whole development of the child, therefore a successful treatment is one that considers the individual as a unified whole and provides an overall, holistic intervention. Holistic means that everything in life, the total functioning of the individual, personal development and social organization, is seen as interdependent, interconnected, multi- leveled, interacting and cohesive (Tatlow, 1988). This idea of "whole" underpins the system from which Peto thought that children with motor disorders would benefit.

B) CE targets the whole personality As Allport (l961) defined "Personality is the dynamic organization within the individual of those psycho-physical systems that determine his characteristic

and behavior and thought." In this definition the word 'organization is important. It means that the personality is not just a sum of traits; one added to another, but rather that the different traits are held together in a special relationship to the whole. 'Dynamic' indicates the constantly evolving and changing nature of the individual's personality. From time to time and from one situation to another, there are changes in the structural organization which are influenced by the concept of self (Hurlock, 1974). In CE the impaired children's personalities are built up in a gradual and age appropriate way. In Peto's system, the individual is not a recipient of treatment, s/he is an active participant in the learning process. CE is a partnership between educator and learners to create circumstances for learning- it is an all day learning process (Sutton, 1993).

C) Activity and intention. Peto stated that restoring the interrupted learning process is not possible without the active participation of the individual. Passive exercises or patterns cannot change or improve the functional stage of the individual.

D) Continuity and consistency Continuity is necessary to reinforce a new skill. An opportunity to use the same skill for many different tasks is also essential. The system has to provide possibilities for children to practice emerging skills not only in specific learning situations but in the many inter-connecting, in-between situations of which life consists. In order to achieve this, CE turns any given part of a child's day into a learning situation. E) 'CE is an interdisciplinary model.

Peto believed that in order to provide a unified treatment it is vital that the group of professionals who are responsible for the program have training based on the same philosophy and relevant practice. Instead of a multidisciplinary approach, Peto applied an interdisciplinary model where a single specially trained group of professionals are responsible for the planning and implementation of the whole process.

THEORETICAL SUPPORTS OF CONDUCTIVE EDUCATION

Peto began constructing his system in the 1920's and further developed it from 19451967. The neuro-physiology, the neuro and educational psychology of his time could not provide him with an adequate theoretical background to support his work. He used his empirical experience as a guideline for his practice. Although it is 'atheoratical' to begin a practice without a theoretical background, later development in basic scientific studies may result in theories that support the practice (Kwan, 1993). The following theories can be used as a support for Peto's system.

Neuro-physiological basis of CE

As a neuro-physiological basis of his theory, Peto, among others, hypothesized that even a damaged central nervous system has a huge amount of residual capacity, which with appropriate teaching, can overcome the functional difficulties resulting from damage or injury. With modern medical imaging technology, the cell structure of the central nervous system became observable. It has been proven that the neurons in the brain are organized into very complex circuits and pathways giving an unimaginable number of possible results. In line with this, the concept of "neural plasticity" has been gaining increasing significance. Learning is believed to take place, as seen from a neurophysiological aspect through neural transmission of some of these highly complex circuits and pathways. They are being recognized as the neurological substrates of various behavior systems. These systems interact and produce certain fundamental "conditions" which include: 1) A state of arousal or attentiveness 2)

A system that encompasses goal-orientation and its consequences such as “reward” mechanism 3) Memory. An immense variety of learning outcomes are possible due to the manner of interaction of these circuitry systems, which have overlapping neuronal pathways.

Neural plasticity is the ability of neurons to modify their original function, for example, the ability of unaffected neurons to take over some of the functions of those neurons that have become dysfunctional. How is this possible? This is due to the richness and flexibility of the connections of neurons, that is, the synapses and the ability to form functional contacts resulting from experience and frequent association of particular afferents. It is essential to facilitate this process with appropriate stimuli. (Re)establishing dormant synapses and axonal sprouting belong to the neurophysiological phenomena that promotes neural plasticity. The phenomena underlying neural plasticity therefore modifies what was previously undisputed, namely, that once brain neurons concerned with a certain function are damaged, that function is permanently lost. Also, it is generally accepted that the average person only uses a fraction of his/her billions of brain neurons. In Conductive Education, the person’s neural plasticity is explored, so that the person can learn in his or her own best way (Hamori, 1997).

Modern motor learning theories

Current motor learning theories show an increase in emphasis on the importance of studying totally meaningful goal-directed actions instead of isolated simple movements (Mulder & Hulstyn, 1984). Gentile (1987) stated that the first stage in any skill acquisition is the formulation of the goal. In motor learning, much emphasis is placed on making the goal clear for the learner. Research shows that individuals improve their motor skills through the use of programmed movements only after they have completely understood the behavioral goal for which the movements are to be used (Brooks, 1986). Emphasis on intention in motor learning is also based on the theoretical concept of the operation of the central nervous system in motor activities. In the distributed control model the main responsibility of the executive system is the regulation of the interactions between the relatively autonomous lower structures, so that they can be integrated into a combined pattern of goal-directed activity (Mudler & Hulstyn, 1984). It implies that the lower structures control movement, whereas the executive system controls action. If this is true, then lesions of the central nervous system disturb the action system, but not the movement system. It means that the main task of intervention should be to rebuild the action plan or the intention (Kwan, 1993).

Limbic system action on motor learning

Brooks (1986) stated that "the drive and its reduction are necessary conditions for motor learning”. The neuro-physiological basis of such a statement lies in the action of the limbic system on the sensory-motor system. The limbic system governs basic biological drives and emotional behavior. It also generates emotional motivation, the need for action. It influences and is influenced by the sensory-motor, non-limbic part of the brain (Brooks, 1986). Therefore, when we arouse the child’ s interest and emotion, we appeal to his limbic system, which in turn enhances the non-limbic sensory-motor system. The role of motivation in motor learning is firmly upheld in Conductive Education. Hari (1975) asserted that learning can only take place with adequate motivation. Moreover, “the goal must have a more emotional character ... Our feelings and our interests inspire what we do” (Hari, 1988). In Conductive Education, the conductor seeks to motivate the children in a variety of creative ways. She uses all her talent, humor and imagination to create an atmosphere of action and interest.

Often, stories with strong emotive elements involving dolls and animals are used to provoke adequate emotional energy for the child to act.

The role of active learning

According to modern motor learning theories, only active trials can improve performance, lead to adaptation, and result in motor learning. In contrast, passive postures and movements imposed on the subject without active follow-up, are of no practical value (Brooks, 1986). The neural basis for this comes from the manner in which the cerebellum and the basal ganglia operate while continuously comparing the requirement of the original intention and the cortical output that comes from active participation in movement. Without active movement, this cortical output copy is not available for comparison and hence will not result in adjustment or motor learning. The idea of active learning is so prominent in Conductive Education that it distinguishes this approach from others. In Conductive Education, the child is always active. The conductors facilitate by providing the appropriate problem and the environment conducive to solving it. It is always the child who constructs his own answer. Instead of being passively moved, the child says for example, "I grasp the table". This continuous verbalizing of an active sense of movement induces a sense of responsibility, as well as dignity in the child. Hari (1988) emphasized that "The conductor must allow someone to reach his goal without helping him directly, at the same time keeping the link with the person active while not interfering directly with the function which should be modified. This is an important aspect of human dignity and human personal freedom". This belief in active participation in Conductive Education started from a psychological perspective. It meets with motor learning theories that study the same subject from a neurophysiological viewpoint. After all, didn't our common sense tell us just this before all these theories and approaches were invented? In Conductive Education, every effort is made to instill success in the client. "The targets set must be realistic, biological-social requirements. Their accomplishment must be intended by the individual, while the pedagogue (conductor) will have to create all the conditions under which the individual can successfully achieve the target he is to reach" (Hari, 1975).

Vygotsky's Social Development Theory

Vygotsky's Social Development Theory also provides a strong theoretical support for Peto's system.
Lev Semenovich Vygotsky (1896-1934), a Russian literature teacher and psychologist, started working in the areas of developmental psychology, education and psychopathology in 1924 (Murray, 1993).
The major theme of Vygotsky's theoretical framework is that social interaction plays a fundamental role in the development of cognition. Vygotsky (1978) states:
Every function in the child's cultural development appears twice: first, on the social level, and later, on the individual level; first, between people (interpsychological) and then inside the child (intrapsychological). This applies equally to voluntary attention, to logical memory, and to the formation of concepts. All the higher functions originate as actual relationships between individuals. (p57). The other determinative concept in his theory is The Zone of Proximal Development (ZPD). The ZPD is the distance between the actual developmental level as determined by independent problem solving and the level of potential as determined through problem solving under adult guidance or in collaboration with more capable peers. A child's actual developmental level indicates a child's level of mental development at a particular time. It indicates the functions

that have already matured in the child. A child's ZPD defines those functions that have not matured yet, but that are in the process of maturing and developing. A child's ZPD permits us to outline the child's immediate future and his overall dynamic state of development (Hanfmann, 1962). Vygotsky emphasized the central role of language in the development of self- regulation. Self-regulation represents the transformation of basic biologically determined processes into higher psychological functional processes such as volitional attention, memory and problem solving (Vygotsky, 1981). In the transformation, the child becomes less bound to and less controlled by the concrete, immediate environmental stimuli but demonstrates the increasing role of self formulated plans and goals in the regulation of behavior. The regulation of behavior begins as a social process and is seen to rely on the mediation with an auxiliary sign of shared meaning between the adult-child dyad within their sociocultural orientation. The sign serves to "break up the fusion of the sensory field and the motor system and thus makes new kinds of behavior possible." (Vygotsky, 1978.). Vygotsky formulated the developmental progression in the use of speech in this respect in three specific stages. First, the caregivers bring in speech and use it to help the child focus his or her attention on salient aspects of the physical, social environment. In this stage, the child is not able to use speech all by him/herself but there is a close cooperation between the child and the adult though the child's behavior is basically regulated by the adults' speech. Later, the child initiates his or her own speech to describe his or her ongoing activities. To differentiate speech from the communicative purpose, such speech-to the self is coined private speech. In this stage, private speech accompanies the child's activity. There is interplay between the child's private speech and the adult's guiding speech in regulating the child's behavior. It is noticed that very often the child's private speech mirrors the adult's guiding speech. The adult's speech augments the child's private speech.

Gradually private speech undergoes structural and temporal changes. It precedes the child's action and is not merely a description of the situation. It is more orienting, planning and guiding in nature. At this stage, private speech does not simply mirror adult's speech. It represents the child's verbal thoughts and arrives at the self regulatory function. Finally, private speech becomes inaudible utterances and "goes underground" as internal thought processes (Vygotsky, 1962). These internalized utterances would appear again as overt speech for problem-solving processes in situations of challenge.

BASIC GOAL AND COMPONENTS OF CONDUCTIVE EDUCATION

Orthofunction

In the early 40's when Peto started to develop his method, the available educational options for children with motor disorders were highly limited. Children who, due to a disability, were not able to fulfill the enrollment requirements of the public educational system either could enroll in a specialized educational setting or could receive a limited home tutorial only (Bairstow, Cochrane, 1993). Peto wanted to provide an educational program that could eliminate segregation and that could integrate those children into society or an educational setting where they belonged. Due to the restrictive educational practice, Peto could not implement his program in an open mainstream setting. Instead he created an environment where children with Cerebral Palsy could meet and learn all of the demands that able bodied peers met with in their everyday life. In order to characterize the aim of his method, Peto introduced the term 'orthofunction'. Orthofunction is not based on a set of specific criteria that the person needs to achieve. Orthofunction is the process of learning based on the concept of reaching one's potential. Orthofunction means that the individual is capable of

learning and is able to fulfill a task. Orthofunction means maximum independence. As human potential constantly changes based on previous experiences, circumstances and learned skills, orthofunction is also constantly changing. CE uses orthofunction to describe the process of learning. The individual is guided by the conductor to find a solution to the task at hand. This is then practiced in the context of daily life and becomes the part of the individual. Orthofunction should be judged on it's qualities as a means to active participation in daily events and not as a set of pre-determined criteria or as a comparison with the performance of others (Hari 1984). In order to achieve orthofunction, Peto created a highly structured and organized educational method that if it were implemented appropriately would be able to maximize the potential of the individual with Cerebral Palsy.

The components of Conductive Education

Peto's system consists of many interrelated facets which when combined make it a powerful force and requires a great determination to understand, let alone put into practice. It is important to emphasize that Conductive Education is a system in its own right. While the elements of this system can be identified and analyzed, these elements cannot be used separately from each other. Conductive Education works only as a unified system, not as a composite or amalgamation (Sutton 1998). Conductive Education as a system has six significant components. The Group The Facilitation The Daily Routine The Rhythmic Intention The Task Series The Conductor

The Group

One of the main principles of conductive education is presenting environmental and psychological conditions that are conducive to the learning process. According to Vigotsky's theory that social interaction plays a fundamental role in the development Peto created the Conductive Group in order to provide the environment where the social and cognitive skills can be developed and improved harmoniously. The group, as the organizational framework of CE, is a community of children with disabilities, parents, caregivers and conductors. In this social environment the child does not simply just meet with the age appropriate social and biological demands but s/he learns to adapt to it. Vygotsky explained that this adaptive process with respect to the development of an indicatory gesture in infancy as a series of stages.

In the beginning it is just an unsuccessful grasping movement directed towards a desired object. As such this is not yet an indication, but it can acquire the meaning if interpreted appropriately by the child's caregivers. At this stage the grasping movement becomes mediated by the social environment and acquires a social meaning 'help me to get this' which is quickly absorbed by the child who begins to use it both for the purpose of communication with the caregivers and for achieving his or her practical goals. While doing this, the child can still be unaware of the fact that he or she is exploiting the gesture as a social signal. Still later this 'gesture-for others' can become a kind of a 'tool' by which the child would exercise control over his or her own actions and behavior, for instance, in order to pinpoint a certain fragment of a picture and concentrate his or her attention on it. This time the child is fully aware that what he or she is doing with his or her forefinger (or whatever may substitute for it) is a special act designed not to let his or her attention wander around the picture but to stick to a

certain elected point. This is the stage when the indicatory gesture exists 'for itself' or, strictly speaking, for the child who utilizes it being at the same time fully aware of that. According to this explanation, from the moment of birth, the child continuously adapts to a system of social demands, which become increasingly complex as s/he grows up. If the child's central nervous system is damaged or not mature enough, he or she is limited in the ability to provide interpretable signals to the social environment and therefore he/she does not receive the positive reinforcement, which would stimulate her/his further development (Vygotsky, 1983).

The group in CE refers to a psychological entity that not only provides the environment for learning but can also be used to facilitate and motivate children. The functions of the individual can be more easily mobilized in collaboration with others. Social skills such as contact making, self-adapting, collaboration and the adoption of a positive attitude to the community, are not only subjects to learn, but also goals to achieve. The special nature of the CE group stems from the fact that despite differences between group members, the same educational goals can be used (Hari and Akos, 1988).Every group member learns the same series of tasks: the differences are expressed in the time required to perform the tasks, the way the tasks are performed, and the level of performance.

Consequently, even though all of the daily activities take place in a group context, it should be emphasized that the members are not subjected to a uniform standard of behavior. Thus, conductive education emphasizes individual solutions to problems and encourages individual development. It is also possible that the child receives one on one attention in order to function better in the group. The composition of the group is important for the functioning of the entire system. Participants must be carefully selected in order to create a program for the entire group that will enable each individual to develop to his or her full capacity and the groups should be large enough to allow for individual differences alongside common traits. The selection process involves constant examination and reexamination, measured by various factors (Lion, 1989). The conductive groups are formed not based on a medical diagnosis but rather considering the functional stage and the general rhythm of the individual. The group is dynamic; it contains individuals with different levels of progress. Its core progress is systematic. Some of its members are beginners functionally, others are on the threshold of release and demonstrate the possibilities. The group does not consist only of children. Group formation also includes the selection of staff, matching staff members to children, and with each other. Thus, the Conductive Group is the main tool for developing interpersonal relations in conductive education and in developing social behavior (Cotton, 1965).

While the group stimulates and encourages the members' motivation, it also provides relief. The group relieves the individual of the pressure to achieve and perform. The group context discourages negative, personal criticism and it encourages positive feedback. Principles of independence and responsibility for oneself are put into practice through the group. This is related to the fact that in a group context the individual is no longer the sole object of attention. This prevents the child from developing excessive dependence on adults. At the same time, it does not prevent the group from satisfying the personal needs of each child. The Conductive Group creates a positive atmosphere for teacher-pupil interaction. It ensures success, and sets the stage for activities in which group members can find ways to solve their problems (Lion, 1989, Tsang-Kwan-Lan, 1991).

It is important to note that Conductive Education as a system includes not just a large number of children but a number of Conductive Groups as well. While the basic principles are the same in every group they are also significantly different from each other. This structure provides an opportunity for each participant to find an environment which is the most appropriate for his/her current functional stage.

Active Daily Routine

Another important component of CE is the active daily routine, which is a flexible frame for the Conductive Group. The daily routine relates to every aspect of group life in the biological and social system of demands. The different activities in the daily routine form a global unit from an educational point of view. Each and every activity furthers the general educational goals. The components of the daily routine are set according to general and specific educational goals. The general goals can be summed up as education toward activity, work, and integration into the community. Within the daily routine, it is essential to ensure that each child assumes personal responsibility, learns to consciously define goals, finds ways to achieve those goals in an attempt to become independent, and, finally, learns how to participate in a mutual relationship in order to play an active role in society (Hari and Akos, 1988). The holistic daily program integrates component parts into a structured unit. It is important to know that the functioning of the parts depends on the extent to which they are meaningful. A series of problems takes on meaning only when it is connected with the daily life of the individual (Hari, 1988). For instance the child with cerebral palsy has to learn to correct his posture and movements not by trial-and-error, but by constant and consistent practice. A wide variety of cognitive and academic programs like art, music and play activities, and group motivation should always reinforce this correct motor pattern. Different components of the daily routine are part of the ongoing cycle of daily life which begins when one wakes up and ends when one goes to sleep. During the day, one needs to satisfy biological-existential needs and fulfill social demands appropriate to the age of the child (Hari and Akos, 1988). The daily routine includes all of the developmental areas. This routine considers the time required to attain daily life skills and to learn academic topics. Both of these aspects are part of a whole. The daily routine also relates simultaneously to different aspects of development. Thus, language and movement can be combined in such a way that movement facilitates language learning and language helps achieve mastery of movement. The daily routine should contain not only the curriculum but especially those aspects that contribute towards maintenance of a positive atmosphere and of attention. The daily routine therefore includes a variety of short activities, whose duration is gradually increased. The holistic nature of the program encourages academic, social, and emotional development. It is hoped that as a result of this program the individual will learn not only how to speak and move, but also how to use what he has learned during the day. Different problem-solving opportunities also provide the chance to use what has been learned in an integrated and comprehensive manner. For instance, during the Daily Routine the educator will show how an action can be broken down into component parts, as this may be the only way in which the child can learn to perform it on his own. The child will learn to use speech/language, rhymes and songs to string the movements together and to remember these sequences. Through imaginative repetition the movements will start to flow more easily and the task-series can be contracted or expanded accordingly and performed at different levels of difficulty within the same group situation. They will then immediately be applied to both the daily and also to new activities. For example, if the conductor expects and waits for the child to bring his arms forward, place his feet correctly, lean forward, grasp the slatted table or the ladder back frame, he will learn to stand up from sitting on his

own in the classroom. The time-table must be flexible in order to enable the program to be expanded if necessary. Time plays an extremely important role in every aspect of the learning process, e.g., movement, communication, and motor activity. Time is also needed in order to acquire skills for taking care of one's self. The conductor is free to integrate any type of academic or non-academic learning and creative or emotional activity into the daily routine. He or she may take advantage of any opportunity to contribute toward the child's overall development (Hari and Tillemans, 1984).

Task Series, Task Analysis

In Conductive Education, a series of tasks are performed in different positions in order to learn different motor and functional skills. Task series are not exercises but the intentionally learnt and implemented elements of different functional activities. These series of tasks are designed to teach the child the components and performance of tasks that are usually learned spontaneously by able-bodied children. All tasks are designed to teach a way to acquire basic everyday skills. Skills are not a series of movements. Skills are games, learning activities, self-care, spontaneous expression, and complex activities and outcomes. The first step of creating a task series for children with CP is the analysis of the functional stage of the child. This analysis can be done on several levels, e.g., behavioral, bio-mechanical, cognitive, perceptual. This analysis provides a basis for identifying underlying abilities, which are the functional preconditions that are integrated into every task. The following are some examples: object perception, problem-solving skills, series of movements, interactive skills, abstract thinking, spatial perception, visual perception, body image, creativity, emotions, memory, attention, and manipulative skills (Shenker 1994). When implementing a task series, the child has a chance to learn how to use particular sequences of actions, how to change the sequence to suit different circumstances, which actions to do simultaneously and when, and how to adapt the actions to suit particular situations. In short, the child has a chance to learn about adaptation. This notion of putting actions together in different ways to achieve different results should be consistently taught and reinforced throughout all task series. For example, the process of looking at someone and calling out to get their attention, waiting till they look at you, moving your eye gaze to look at something you want, then looking back at the person can be a complexity of simultaneous and sequenced actions for someone who has a severe physical disability. Many component skills of this task can be practiced in a task series (Hari, 1991). In designing the task-series, we must take into consideration the special problems of the children with different diagnoses. Since the level of performance among children with the same diagnosis varies as well, the conductors have to be keen observers in order to help each child to work out his/her particular method to achieve the task at hand. For example, those who can't stretch their arms in a sitting position are allowed to do so in the lying position where it might be easier. Some children may perform a movement once only, while others perform it twice within the same time limit (Hari 1990). In other words, the children are given just achievable tasks which require an appropriate effort. In Vygotskian terms the task is set within the child's Zone of Proximal Development: outside the child's current level of knowledge and skill, but inside his or her current potential level of learning (Vygotsky,1962)

There are basic skills that are common to many functional activities. These basic skills need to be practiced in different ways to enhance the child's ability to eventually use the skill in a variety of ways. For example,' weight shift' is a movement "foundation skill" and it is experienced through

arms, legs, head, hip and trunk in lying, sitting and standing. By learning "weight shift" as a total concept and practicing it in a variety of ways the child is preparing herself to use it in different situations. Another example of ‘foundation skills’ is the item-by-item scanning. When the child is using a communication board in order to send a message or answer to a question, s/he has to use scanning of some sort. Basically, to produce the message she has to see/hear something and indicate `yes' or `waiting', see/hear the next thing and indicate `yes' or 'waiting' and so on until the right thing is offered and she indicates `yes'. If the child practices this concept of scanning in a variety of ways, she will be able to use it in many different ways to suit her position, the topic, who she is talking with and the situation in general. Sometimes s/he might be expected to do visual scanning, sometimes auditory, sometimes electronic scanning etc. Through a variety of activities during the task series and a great deal of practice the child learns the requirements of scanning.

The series of tasks is performed in different body positions (lying down, sitting, standing). The series components are implemented in everyday situations, wherein they are refined and then these components are integrated into the daily program that provides the individual with opportunities to practice alternative means to attain goals. The program thus gradually becomes more difficult and complex, and ultimately leads to performance of the functional task (Clark-Wilson and Gent, 1989). Since the learning takes place in a context focusing specifically on the task and the environment, the objectives are planned so that they can take place in changing conditions. Clark-Wilson and Gent (1989) formulated four elements of skill-acquisition which can explain how a task series leads an individual to learn and apply functional skills.

1) The Cognitive Stage: At this stage, task components are learned and built up into a task series. Emphasis is on the individual, who thinks about his movements in the context of the overall function. At this stage, external verbal regulation is used. 2) The Stabilization Stage: This stage involves considerable experience in different situations in order to allow for the skills to become established. At this stage, language begins to be internalized. 3) The Automatic Stage: This stage is attained when the individual no longer needs to think about each physical movement and can achieve the functional goal. At this stage, language is completely internalized. 4) Generalization: Generalization occurs when the skill achieved in the automatic stage is applied in every functional situation (Clark-Wilson and Gent, 1989). During the task series, speech and gestures are used for instruction and rhythmical intention is used for regulation of the movement.

Rhythmical Intention

According to Vygotsky speech has not only a communicative function but also performs a regulatory role on volitional behavior (Kwan, 2001). Based on similar concept, Peto innovated the use of the semantic and rhythmic part of speech as a tool for children with brain damage to plan, intend and regulate their movements for carrying out motor functions.

Rhythmical Intention” is the term he used to describe this technique. Peto suggested that children should always speak and those unable to speak, vocalize. The speech commands in Conductive Education are delivered before (the intention) as well as during the movement. “Rhythmic intention is the person’s mental preparation. via a symbolic representation, for overt behavior”(Hari and Tillemans, 1984). Rhythmical Intention helps to plan, intend and carry out a movement. It is the way in which the conductor guides the group. A great deal of attention is paid to this aspect of the task-series: the linking of speech and movement. Other aspects of the task-series are important too, such

as imitation and rhythm, both in the form of impulsive aspects of speech, and in the form of an overall rhythm in the task-series. The very meaning of the two words "Rhythmical Intention" (rhythm referring to the motor aspect and intention referring to the semantic aspect) indicated that Petö considered both to be important. The intention carries the instruction, first from adult to child in the task-series and then the child repeats the intention to plan and organize the movement. This is followed by the rhythmical counting of 1-2-3 or the rhythmical "up-up-up", using the motor aspect of speech to aid a rhythmical execution of another motor act, a movement. There is general agreement that speech can have a regulative function and that young children have difficulties in using their speech for self-regulation. Early self-regulation is non semantic and in young children semantic self-regulation, is on the whole rare.

The child's age and the degree of task difficulty are important factors in the child's ability to use self-regulative speech. Reese (1962) proposed that the stage of concept formation decided if the semantic aspect of speech could be used in a regulative function and that age was less important than type of task to decide whether speech could be used for regulation or not. The use of Rhytmical Intention in CE in the regulation of motor behavior resembles the function of private speech in Vygotsky's concept on the development of higher cognitive process (Kwan 2001).

Rhythmical Intention has other effects than just regulating motor action. It can help to harmonize the group and coordinate its activities. Songs and rhymes used as Rhythmic Intention can create a pleasant atmosphere. Rhythmical Intention increases acoustic sensation. With the use of Rhythmical Intention, an activity becomes the child's own voluntary effort.

By using rhythm for a specific task, the child develops a sense of time. The child is not just doing the movement, he also learns about the speed of the movement. Rhythmic Intention has several forms and its utilization based on Vigotskyi's theory is that it depends on the age range and functional stage of the children in a particular group. For example for young children from 6 month up to 3 years of age in a Mother and Baby Group, the rhythm is usually provided by the rhythm of a song or a nursery rhyme.

Sometimes, the meaning of the songs or rhymes are correlated with the movements which were performed in an imaginative way e.g. singing about dancing whilst the children performed stepping movements with the legs in standing. At other times the songs and rhymes were there to provide rhythm. Often one particular song is used with a particular task-series. In this way the children are helped to remember the movement sequences (conditioning). For kindergarten age children between 3 -6 years of age, songs and rhymes are still frequently used to provide a (mainly) 1 - 2 rhythm. But the children more often verbalize the intention and also count from "1 - 5". Conductive Groups are often mixed, that is spastic, athetoid and ataxic children are in one and the same group. In these mixed groups, there is need to find a rhythm which is not too fast for the spastic children, or too slow for the children with athetosis and ataxia.

While the Conductive Group is diverse in abilities and conditions they general needs are similar. Although the same rhythm is used for the mixed group, the conductors will instruct the athetoid and hypotonic children to act on the count of "1" and then hold the position on the counts "2 - 5". Holding the position counteracts athetoid movements. The conductors tell the spastic children to act slowly within the counts of "1 - 5". This gives the slow spastic children, time to move and time to

relax. Once learned, the rhythm is internalized and the individual is able to utilize this in many forms. As the process of learning skills advances, the need to verbalize intention and rhythm is reduced and it is at this stage that we can say that learning has taken place.

Facilitation

In Conductive Education, the educational strategies, equipment and environmental factors that can assist the children in their learning are referred to as facilitation. In therapeutic approaches, facilitation means the stimulation of the cerebral palsied child's spontaneous movement reactions, in response to the therapist's special techniques of handling and manipulating the patient.

In Conductive Education, facilitations must be used in such a way that the child has the impression that he is the active one, he himself found the movement, and that any progress was his achievement. This is what will motivate the child to find his own solutions and to persevere with his tasks. As Hári stated: 'The important point most clearly distinguishing Conductive Education is that it teaches how to use all facilitations for learning consciously" (Hari and Akos 1988). The facilitations interact together and are used in order to stimulate, motivate and support the learning process. There are many, different types of facilitation that can be used. One of the most important is the learning environment itself. In Conductive Education, it means that within the classroom everything is within a realistic distance, therefore the children can actively change their place during the day. Another important facilitation is the daily routine itself. It is basically a flexible timetable that provides enough time for the different ages and conditions and includes learning self-help skills such as eating, drinking, dressing and toileting.

The simple, multipurpose Conductive Education furniture such as the slatted plinth, ladder-chair, stool bench and floor ladder help facilitate the children to learn different motor activities. The size and the construction of the furniture helps the children learn and maintain proper positions with minimal manual or personal assistance.

The different positioning of the body also can help the children learn functions consciously. For example, if the child cannot lift both of his/her arms up in a sitting position, he/she can learn it initially by lying on a plinth on his/her back holding onto a stick. In this case it is easier to implement this task independently and this motion later on can be applied in a different body position such as sitting or standing.

Making use of the effect of gravity on the child's movements/actions is yet another way of activating the child. For example when a child is pushing himself backwards off the plinth while lying prone, his legs will 'fall' towards the ground once his hips reach the edge of the plinth. This will help the child to overcome his extensor spasticity – and facilitate his standing, sitting down, squatting down etc.

The dynamics of the Conductive Group is also an important facilitator. While part of a group, the children accept the challenge of overcoming their difficulties because every one else is doing so. If the conductor knows how to correctly guide the group, the children quickly become achievement-oriented It is important for the children to work at their individual level within the group. This will motivate them and by doing so, they will model various solutions for other members of the group.

For example, by seeing the various steps towards walking, the children ‘ know what to aim at next. In their eagerness to progress, they often come up with their own solutions. It is the very nature of Conductive Education that the whole educational process is implemented by a single group of professionals, by the conductors. The most important facilitative factor is the interpersonal relationship between the conductors and the group.

The Conductor

The personality of the conductor has a major contribution in the successful learning process. People often ask where the name "conductor" originated. The answer to this question lies in the delicate dialectics between the individual and the group. Like an orchestra conductor, the group conductor regulates the activities of his group. On the educational level, the conductor integrates different professional aspects required for rehabilitation (Cottam and Sutton, 1986). The conductor is an educator who draws from relevant aspects of medicine, education, and psychology. The conductor is not a combination of physiotherapist, occupational therapist, speech therapist, and nurse. By definition, the Conductor is not intended to replace various specialists, but works alongside them. The conductor is responsible for creating a uniform developmental experience for the child, where every aspect of development is viewed from a consistent educational perspective pertaining to the here and now throughout the child's developmental process. Most of the activities are multi-dimensional, i.e., the same activity integrates learning of motor, cognitive, language, social, and other skills. The knowledge and skills for such integrative group activity constitute the main part of the conductor's training (Lion, 1992).

Using his special skills and knowledge, the conductor can create conditions to conduct the group. By teaching the coordination that derives from intention and using various forms of motivation, the conductor arouses the group's attention and maintains their interest. The conductor is the one to set standards for the group, to encourage internal communication, to create a positive atmosphere, to instill a sense of security, and to respond to the needs of each group member. He is responsible for ensuring successful cooperation within the group. His main function is as a catalyst that helps the individual find a new path towards activity which can renew the implementation and realization of intention. The conductor encourages spontaneous individual activity by helping the child discover how to arrive at solutions through a set of guided objectives and tasks (Hari, 1990).

Note: The following references can be used as a reading list on Conductive Education

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