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Diagnosis, rehabilitation and education of children with cerebral palsy according to the concept of Conductive Education
Diagnoza, rehabilitacja i edukacja dzieci z mózgowym porażeniem dziecięcym w koncepcji Nauczania Kierowanego

Summary

It is estimated that ca. 60 thousand children are affected with CP In Poland. Due to the complexity, variety of symptoms and varying degrees of severity as well as multiplicity of coexisting disorders, it is necessary to surround every child suffering from CP with an appropriate complex care. Among many methods of improvement Conductive Education adopts a holistic approach to disabled children and their families by integrating therapeutical activities, with social and educational as well. It is a complete, multilateral response to the needs of children with CP. Multilateral diagnosis, along with the improvement of motor functions combined with simultaneous intellectual development and social life brings visible results. Description of multilateral diagnosis, education, rehabilitation, with a special regard to motor therapy in the concept of Conductive Education is the subject of this paper.

Key words: Child Cerebral Palsy, The System of Conductive Education, multilateral diagnosis, improvement, rehabilitation

Streszczenie

Szacuje się że w Polsce jest około 60 tysięcy dzieci dotkniętych dziecięcym porażeniem mózgowym. Ze względu na złożoność, różnorodność objawów i różny stopień ich nasilenia, a także wielość współistniejących zaburzeń konieczne staje się objęcie każdego dziecka odpowiednią kompleksową pomocą. Wśród wielu metod usprawniania System Nauczania Kierowanego przyjmując holistyczne podejście do dziecka niepełnosprawnego i jego rodziny integruje działania rehabilitacyjno-edukacyjno-społeczne. Stanowi pełną, wieloprofilową odpowiedź na potrzeby dziecka z mpd. Wieloprofilowa diagnoza, usprawnianie funkcji ruchowych połączone z jednoczesnym rozwojem intelektualnym i społecznym przynosi widoczne efekty. Opis wieloprofilowej diagnozy, edukacji, rehabilitacji, ze szczególnym uwzględnieniem usprawniania ruchowego w koncepcji Nauczania Kierowanego jest przedmiotem prezentowanego artykułu.

Słowa kluczowe: dziecięce porażenie mózgowie, System Nauczania Kierowanego, wieloprofilowa diagnoza, usprawnianie, rehabilitacja

Introduction

Cerebral palsy (CP) was first described, in one of its many kinds, by an English orthopedist William John Little in the nineteenth century, and as a consequence, for a long time it was originally called by his name – “Little’s disease”. The name ‘cerebral

palsy', which was accepted by the American Academy of Cerebral Palsy, was introduced in 1888 by W. Osler. In Poland, this term operates in the medical jargon since the proceedings of The Neurological Section of Child Care of the Polish Neurological Society, which took place in Gdańsk in 1965 (Mihilewicz, 2006).

Due to the enormous variety of symptoms and varying degrees of severity and multiplicity of coexisting disorders in cerebral palsy, there is a wide variety of different definitions and clinical divisions of CP used at large; accordingly there are different approaches to the therapy and rehabilitation of patients with CP. Unfortunately, establishing one universal definition of CP, classification of characteristic features, and therapeutical process of rehabilitation is still difficult.

In Europe the most widely used definition, drafted in 1993 in Ljubljana, defines CP as "an umbrella term covering a permanent, but changing with age, variety of motor and posture disorders co-existing with other symptoms (epilepsy, mental retardation, impaired vision, hearing, and speech) caused by a permanent brain damage occurring at an unfinished stage of development" (Kułakowska, 2003, p.269).

The damage of undeveloped brain causing CP can arise from a variety of reasons concerning the structures of the brain which regulate motor activity of humans (pyramidal tracts, extrapyramidal system, and cerebellum) and leads to numerous disorders pertaining to: speech and communication, sight or hearing, equanimity, level of mental development; and is, above all, the dominant cause of disharmony in the development of motor functions, resulting in kinetic dysfunctions, paresis, and asymmetries (Kluczyk , Wyrzykowska 2010).

Thus, a necessary early and in-depth diagnosis has to take place and a subsequent process of rehabilitation, learning, and education, containing the improvement of motor functions together with other areas, in accordance with the proven thesis that all areas of development of the central nervous system are subjected to simultaneous integration processes, which are intensely interactive, although spread in time.

Diagnosis, which is defined as "a recognition of the current state by ascribing a particular type and species to the causal and comprehensive explanation of this state, which determines its current phase in order to anticipate the further development" (Ziemski, 1973, p.68), is a process of active search for the information necessary for a decision and efforts to change the current status of psychosocial development. A good diagnosis should be: positive, prophylactic, therapeutical, comprehensive, and directing the process of assistance and correction of the development (Marcinkowska, 2005). Improvement is an essential element of a comprehensive therapy. According to Grossman the essence of rehabilitation of children with CP is to stimulate multi-development of all disturbed areas. Improvement is therefore a functional part of rehabilitation, leading to maximum independence in physical, social or professional area (Zabłocki, 1998), constituting active learning of all necessary tasks in life, according to age and psychomotor possibility (Król, 2010).

That is why the care over a disabled child makes sense insofar as it solves the problems over the entire period of maturation, i.e., up to 18 years of age and longer, and the process of improvement and rehabilitation is integrated similarly to the integration of the symptoms of the child. Thus, if symptoms pertain only to the kinetic movement of

the child with CP, physical rehabilitation can not be sufficiently effective. The process of improving the movement should entail education as well. Integration of three areas of therapy (treatment, rehabilitation and school education) in the form of integrated rehabilitation and education is the basis for the concept of Conductive Education.

Conductive Education is characterized by a holistic approach to children with disabilities and their families, and provides a complete, multilateral response to their complex needs (Król, 2001).

Description of multilateral diagnosis, education, rehabilitation, with a special regard to motor therapy in the concept of Conductive Education is the subject of this paper, in which specific issues will be presented in each of its parts, namely:

- Cerebral palsy among children,
- Conductive Education as a comprehensive approach to child therapy with cerebral palsy, a description of the diagnosis, rehabilitation, and education with regard to the improvement of motor development.

Cerebral Palsy among children

In Poland two-third of every 1000 living new-born infants are born with cerebral palsy (CP), it is estimated that ca. 60 thousand children are affected with this disability. However, presenting reliable data concerning the epidemiology, is problematic indeed because the direct diagnosis of cerebral palsy after birth is very difficult, and becomes possible only later, since it is very different for various forms of CP at particular periods of life of the child (usually ca. the first year of life).

Causes of cerebral palsy may be divided into three main groups, depending on the timing of:

- 1) intra-uterine infections of the central nervous system, birth defects of the brain, toxic damage to the fetus and fetal alcohol syndrome;
- 2) perinatal causes, including hypoxic-ischemic states of neonates born with periventricular leukomalacia and intraventricular ischemia usually associated with premature births;
- 3) postnatal causes, including head trauma, inflammation, meningitis and brain damage, occurring during its dynamic development (Belza, 2010; Mazanek, 2003).

Clinical picture depends mostly on the development and maturity of the Central Nervous System at the moment of activation of harmful factors (Loska, 2005).

The infant brain is in the unfinished stage of development, which means that due to the capacity of the brain tissue and brain plasticity involving the possibility of diversification and adaptation of healthy areas of the brain to the stimuli coming from the environment, children can still learn certain psychomotor functions.

Damage in the Central Nervous System affects the motor system of the child, which, in turn, disturbs motor co-ordination, stability, and causes abnormal posture. Moreover, it causes incorrect muscle tone (intensified tautness - spastic reactions, or lowered - flaccidity), paresis (restraints of movement), palsy (complete paralysis), and involuntary movements (Loska, 2005).

The child with CP, apart from motor dysfunctions, has usually many additional medical problems. Most of them include: epilepsy, retardation, learning disability,

problems with attention span, and augmented motor activity, as well as speech impairment, dysphasia, bad hearing, and low vision, which have a neurological basis. Among orthopedic problems one can enumerate: scoliosis, dislocation of spine, articular contracture, asymmetry in the length of the limbs. Furthermore, children with CP have problems with communication, salivation, depression, frequent fractures, dental losses, and constipation (Loska, 2005; Mazanek, 2003).

Such complexity and variability of neuropathological cases, results in a multiplicity of maps of CP. Ingram's division is the most popular, because it is based mainly on the criterion of topography. It differentiates between the following clinical states: spastic hemiplegia (hemiplegia spastica), spastic diplegia (diplegia spastica), bilateral hemiplegia (hemiplegia bilateralis), cerebellar, and extrapyramidal form.

Conductive Education

Conductive Education is one of the methods of therapy for children with cerebral palsy, in addition to such methods as Glenn Doman's method, SI (sensory integration), the PNF method, Bobath's, or Vojta therapy, etc. This method consists of a specially designed system of teaching children so that they can gain as much independence. Its author is a Hungarian physician and educator Andras Petö (Belza, 2010). The system of Conductive Education, which combines rehabilitation, education, and social actions, is characterized by a holistic approach to handicapped children and their family, and constitutes a complete, multilateral answer to their special needs.

Multilateral improvement, in the Conductive Education system, deals with two-dimensional, parallel, integrated, and harmonized improvement of the following functions:

- neuromotor function (learning to move from place to place),
- self-reliant function (learning everyday activities – eating, putting clothes, and going to the toilet),
- communicative function (learning to speak, or non-verbal communication),
- intellectual function (learning the school curriculum) (Jagoda-Kordulska, 2003).

The aim of multilateral improvement in the system of Conductive Education is:

- broad development of children (based on actual functional evaluation), integrated education and rehabilitation of damaged psychomotor functions, as well as providing children with comprehensive care and realization of their needs according to the individual possibilities,
- supporting and directing the development of the child based on his individual potential in relation with the social, cultural, and natural circle,
- preparing children for school, or ensuring the implementations of school duty,
- attainment of ortofunction (optimal for the child's level of ability) in every disturbed sphere of functioning according to individual possibilities and needs,
- aspiring to the maximal individualization of children (Jagoda-Kordulska, 2002, 2003).

The system of conductive education taking care of the child with cerebral palsy at any age with appropriate complex assistance. The starting point of the therapy, rehabilitation, and education is the diagnosis, where therapy and rehabilitation evaluates, extends and modifies the initial diagnosis.

A very important role in diagnosis is played by the diagnostician. Thus, basic predispositions of the investigator include: theoretical knowledge, the ability of logical thinking allowing for a creative reasoning juxtaposing different information, the ability to observe and lead a conversation, and specific technical skills (the pool of available diagnostic techniques and the ability of adequate choice) (Wysocka, 2006).

Achieving a diagnosis of cerebral palsy is a difficult task. It becomes possible only when the child is about one year old, but greater certainty can be achieved when the child reaches 18-24 months. In the first year of child's life their brain undergoes intensive changes: the process of brain maturation, a modification of this process in prematurely born children, a few months of the evolution of early brain damage, functional changes due to the phenomenon of plasticity. Occurring processes may give a picture of transitional effects. It is not possible to predict a child's development with a 100% certainty. In making a diagnosis further medical tests such as: magnetic resonance imaging, cranial ultrasound scans are helpful and advisable.

Diagnosis is made by a team of specialists, which includes: a physician, a psychologist, a teacher, a speech therapist, a physiotherapist. Each team member looks at the child through the prism of their specialty, and then develop a diagnosis which emphasizes over and above the child's abilities. After conducting the diagnosis and consultations the team of specialists determines the best course of action for the child in question.

During the period of school maturity children with cerebral palsy attend the Centre on the basis of a referral from a GP and/or a neurologist. The diagnosis of a child begins with a visit to a doctor employed at the facility, who then conducts an interview and physical examination based on information obtained from parents and data from medical records (information from cards of hospitalization, rehabilitation camps cards). Physical examination consists of: the child's personal information, family interview, social interview, developmental history, description of the relevant hospitalization/surgery, history of treatment for specialized investigations.

Physical examination ascertains the type of CP, type of kinetic impairment, the gait pattern, and determines the scale of the adopted child's skill level in terms of: gross motor co-ordination – lower limb, and precise motor skills (grip pattern), features the wrist, hand and finger. It describes additional impairments connected with CP (e.g. sight, hearing, sphincter control, etc.). The final stage is an examination of joint mobility, muscle length, muscle tone, spasticity, and the description of standing and sitting positions, active movements / selectivity and orthopedic parameters (Olchowik, 2010).

Simultaneously, or after the medical examination, the diagnosis of a child is made by a team composed of a teacher, physiotherapist, psychologist, speech therapist. The work is coordinated by a team leader, who is usually a physiotherapist or a teacher.

The basis for the diagnosis of every specialist is an interview, observation of the child, and specialized examination pertaining to a specific area.

Educational diagnosis is made by a teacher on the basis of interviews and standardized tests, such as for example: the Inventory of H.C. Gunzburg to assess progress in social development (PPAC, PAC-1, PAC-2 depending on the level of mental disability), A Profile of Student Achievement (J. Kielin), A Questionnaire of Sensomotoric Development of Children (by Zbigniew Przyrowski), A Questionnaire of Sensory Risk Integration Disorder among infants and young children (10-12 months, 13-18 months, 19-24 months, 25-30 months) (by Georgia A. DeGangi), Clinical observation (by Zbigniew Przyrowski).

In addition, the child is observed during free play, self-service, contacts with peers, contacts with adults. It is important to focus on what incentives the child provides for oneself, what toys they prefer, whether they can handle basic operations and how they cope with them. Also, the auditory, visual, olfactory (preference of strong incentives, hypersensitivity for some stimuli), and how they react to different tastes.

Another specialist, who examines the child is a psychologist. The starting point for a psychological diagnosis is an interview with parents or the guardians of the child and observation of the child's behavior during free play, where special attention is paid to social contacts made by the child, establishing relationships, self-service skills, etc. Data necessary for psychological research is achieved by the use of standardized psychological tests. The selection of a test depends on the functioning of the child's: intelligence quotient, communication skills (verbal or alternative), motor skills. Tests used for psychological diagnosis include: Columbia Mental Maturity Scale, the Brunet-Lezine Psychomotor Development Scale, the Child Development Scale (DSR test), Leiter International Performance Scale, The Terman-Merrill intelligence scale.

It is possible to choose between two of the abovementioned methods in order to test a child. A subsidiary scale is the measurement of social competence according to B. Doll, which is used to indicate strong points of the child's functioning. The final psychological diagnosis is made in the course of several meetings with the child, and its evaluation is carried out once a year.

Due to the complexity and variety of speech disorders among children with CP the diagnosis of speech cannot apply standardized tests. Speech diagnosis, used in many centers of Conductive Education for children with CP, consists of the following stages:

- Interview with the child's parents
- A preliminary assessment of child's development and communication
- Getting to know the specialist documentation
- Speech examination

Among children who don't use verbal language, a selection of alternative methods of communication (AAC) is made, depending on the level of functioning of the child and his or her motor and intellectual skills. Speech diagnosis is a descriptive diagnosis, made once a year, according to the needs and the level of child's development.

Another specialist, who diagnoses the child is a physiotherapist. The basic tool of their examination are standardized tests:

- PEDI (Pediatric Evaluation of Development Inventory),
- GMFM (Gross Motor Function Measure) (Kluczyk, Wyrzykowska 2012).

Presented above multilateral diagnosis of a child with cerebral palsy, which is the basis adopted in the Conductive Education System of Polish rehabilitation model, assumes universality (availability), early integration, comprehensiveness and continuity.

The principle of continuity in planning is carried out by determining individual therapeutic long- and short-term goals, and changing programs of improvement, individualized daily schedule of therapeutic activities and advice for parents on days off from therapeutic classes.

Multilateral diagnosis prepared in accordance with the accepted principles is the starting point for the development by a team of therapists, individual therapeutic

education program (IPET) of a child with CP. The IPET, developed by experts in the System of Conductive Education contains the detailed description of the current state of achievements of the child, including the following areas: communication, self-handling, kinetic ability, cognitive functions, and social behavior. Recommendations for therapeutic work are determined by defining goals and objectives for various areas of life, activities, and ways of their implementation. Depending on the child's needs and specific objectives, the defined goals can be modified. The program is made available to parents who, after being introduced to its content make their own proposals for changes. Conclusions and recommendations for further work are an indication for individual therapists working with children suffering from CP, who are committed to continuous monitoring of the child's physical condition and constant modification of their program.

A group of children selected according to the speed of their work and their age is led by a special therapeutic team. The major leader, called in Conductive Education, "first conductor" should possess interdisciplinary knowledge from the medical field, psychology, pedagogy, physiotherapy and speech therapy. Other persons also participate in the courses, they are called 'second conductors'. Their role is to keep an eye over the children and help them in their work. Lessons, in Conductive Education, are called 'task series' (Jagoda- Kordulska, 2003).

Each child in the system of Conductive Education is covered by long-term rehabilitation and education program, which consists of: daily schedule, individual short- and long-term programs realized in a group, semi-annual and annual progress assessments, as well as evaluations and modifications. The curriculum covers all aspects of occurring dysfunctions, not only improving kinetic movement but also school, social, emotional, aesthetic and moral edification. Daily schedule includes time to do such basic things as standing, walking, writing and many other.

Some of the precisely developed series of classes, whose implementation is considered of great importance, are manual exercises, called classes of hands. Manual rehabilitation is a starting point for achieving functional independence. According to the creator of the Conductive Education therapy method, Andras Peto – manual improvement of children with CP is of paramount importance. Efficient hands (and senses) are the key to understanding the world. It is with the help of the hands that a child grasps, puts in his mouth different objects in order to find out more about them, then raises them up to watch them. By manipulating objects for their own use and according to their ability and stage of development, children perform various manual movements. A developing child uses his hands in most activities in life: eating, dressing, cleaning. It upholds the furniture while walking on its own. It uses them to deliver most of the various functions and tasks - turning pages, writing, playing the piano, touching another person, creating its own "works of art". Therefore, the development of dexterity is so valid and important. Improving manual function has an important place in the concept of rehabilitation in Conductive Education, which aims to devote as much time as possible (Król, 2010). There are no sets of ready-made programs and activities for children with a specific type of disorder in this series. The leader according to his or her own predispositions, capabilities and needs prepares them for the needs of each group and for each child, in accordance with the principle of individuality (Król, 2001, 2010).

The Conductive Education method does not require expensive equipment, it uses a specifically designed, good quality Petö furniture. Simplicity and scarcity of equipment in a room promotes greater concentration of children on the undertaken activities allowing for a better adaptation and memory. It is important that the child has the opportunity to focus on the person leading the course and the content offered by her such as play and movement exercises (Bełza, 2010).

In the System of Conductive Education teaching and rehabilitation belong to an integral whole. The motor improvement occurs with the development of cognitive, social communication and conducted by a team of specialists, and their proposed activities include all parallel areas of child development. Thus, any series of tasks in Conductive Education consists of a harmonious combination of educational and therapeutical purposes. While carrying out subsequent tasks in a series of motor tasks, a child has the opportunity to develop their cognitive capacities, strengthening the knowledge and skills, which had been the premise of educational agenda. Whereas in the educational activities a proper sitting position is the starting point for the correct implementation of a kinetic task. The schedule allows for a transfer of the abilities acquired in the classroom to different educational situations and in everyday life. Better memory and movement is achieved by communication and rhythm. Speech and rhythm facilitate recording and storing motor activity (Kułakowska, 2009; Król 2001).

According to the tenets of Conductive Education, the integration of cognitive, social, communicative, and kinetic development is supported by numerous forms of therapy. Among them there are:

- kinesipathy including neurophysiological methods: NDT-Bobath and PNF,
- diagnostics and psychological therapy,
- speech therapy,
- non-verbal communication
- sensory integration,
- educational therapy.

A special place in the process of improvement belongs to classical massage, Schantal's massage, Activity Programme Knill, the method of rehabilitation PNF, and the method of rehabilitation NDT.

The effects of the motor rehabilitation, such as learning of correct motor models, the inspection of the conduct, improving the manual functions, are being judged every 6 months by the staff of specialists. Depending on the progress and individual needs of the child new objectives are being created and an alteration of the curriculum is made (Kluczyk, Wyrzykowska 2010).

Conclusion

Conductive Education is a complete, multilateral response to the needs of children with CP and their families by integrating therapeutical actions together with educational and social skills. This complex approach, which is an asset of the Peto method, combines psychological, educational, medical and social therapy. Kinetic improvement takes place along with the development of cognitive, social, and communicative functions, and is

led by a team of specialists, who propose parallel activities including all areas of child development. In-depth diagnosis encompasses every sphere of impaired functioning described by a team of specialists on the basis of accurate and multilateral observation of the child, interviews and selected standardized tests. The work of the whole team enables a comprehensive approach to the child's wellbeing. Systematic cooperation of specialists creates the possibility of continuous operation, dependent on the emerging needs and current changes in the evaluation of therapy in the adopted program of rehabilitation. The child, therefore, is here a subject, and their capabilities, needs and skills in the complex conditions of diagnosis and process of rehabilitation constitute the basis for any further improvement.

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