Stecko Monika, Wawryków Agata, Korabiusz Katarzyna, Kordek Agnieszka, Fabian Danielewska Anna, Wilczyńska Agnieszka, Janik Inga, Maciejewska Martyna. The methods of therapy of children suffering from cerebral palsy. Journal of Education, Health and Sport. 2018;8(9):562-569 eISNN 2391-8306. DOI http://dx.doi.org/10.5281/zenodo.1412037
http://ojs.ukw.edu.pl/index.php/johs/article/view/5900
https://pbn.nauka.gov.pl/sedno-webapp/works/876537

The journal has had 7 points in Ministry of Science and Higher Education parametric evaluation. Part b item 1223 (26/01/2017).
1223 Journal of Education, Health and Sport eissn 2391-8306 7

Received: 02.08.2018. Revised: 18.08.2018. Accepted: 09.09.2018.

The methods of therapy of children suffering from cerebral palsy

Monika Stecko[1], Agata Wawryków[1], Katarzyna Korabiusz[1], AgnieszkaKordek[2], Anna Fabian – Danielewska[1], Agnieszka Wilczyńska[1], IngaJanik[1], Martyna Maciejewska[1]

[1]Pomeranian Medical University in Szczecin, Doctoral Study of the Faculty of Health Sciences, Żołnierska 54, 71-210 Szczecin

[2]Pomeranian Medical University in Szczecin, Neonatal Pathology Clinic, Aleja Powstańców Wielkopolskich 72, 70-111 Szczecin

ABSTRACT

Cerebral palsy and methods of therapy that can be applied in the process of rehabilitation of children described in this article. Cerebral palsy is a motor syndrome caused by permanent damage to the structures of central nervous system in the prenatal, perinatal or postnatal period [1]. Cerebral palsy is a complex therapeutic problem. It is not possible to cure it completely, therefore, the main goal is alleviation of pain to make the child as independent in everyday life as possible [2]. Nowadays, rehabilitation of children suffering from cerebral palsy is based on the methods of neurodevelopmental rehabilitation, which are the most effective and more child-friendly. These methods include, among others, Vojta and NDT-Bobath method. Additional methods that can be applied while supporting the development of children suffering from cerebral palsy are sensory integration method and MEDEK method. If appropriate and comprehensive rehabilitation shall be initiated at early stage in children

suffering from cerebral palsy, the chance for achievement of proper mobility in the future will be bigger [3]. The effects of therapy depend on the type of damage, regularity of therapy. Therapeutic program must be selected individually to every child after thorough diagnosis and observation [2,4].

INTRODUCTION

Cerebral palsy is a motor syndrome caused by permanent damage to the structures of central nervous system in the prenatal, perinatal or postnatal period [1]. According to various statistics, cerebral palsy occurs in between 2 and 3 per 1000 childbirths [4]. Many factors affect the development of cerebral palsy, including: premature birth, hypoxia and ischaemia of a foetus, extremely low mass of a foetus, multiple pregnancy, infection during pregnancy and age of mother below 16 and above 40 [5]. As it was mentioned above, cerebral palsy is a syndrome of incorrect posture and locomotion occurring in various clinical forms, above all, in spastic, hypotonic or dyskinetic forms [5]. Moreover, children may have epileptic seizures, hearing and vision disorders, speech disorder, mental retardation and behavioural disorders [6,7,8]. Cerebral palsy is a complex therapeutic problem. It is not possible to cure it completely, therefore, the main goal is alleviation of pain to let the child be as independent as possible [2]. In the process of rehabilitation of children suffering from cerebral palsy, the goal is not treatment, but rather generation of optimal functional patterns [2]. In accordance with general rules, rehabilitation of children should be common, early, continuous and comprehensive, however, there are also additional „paediatric" rules[9]. While supporting the development, we may not focus only on motor sphere of a child. Because cerebral palsy is a complex problem, child needs multi-profile help to prevent and mitigate additional symptoms [9]. That's why cooperation of many specialists in the process of rehabilitation and involvement of the parents are so important [6]. The forms of cerebral palsy are diverse due to location of and heaviness of symptoms, every little patient should be treated individually. Early diagnostics and finding abnormalities are the most important issues in the child development. Quick implementation of rehabilitation process improves the quality of patient's life at a given stage of development and in the future [1]. The progress of knowledge in the field of neurophysiology and neuropathology made development of methods based on broadly defined neuromuscular re-education possible [11]. Nowadays, rehabilitation of children suffering from cerebral palsy is based on the methods of neurodevelopmental rehabilitation,

which are regarded as the most effective and childfriendly. These methods include, among others, Vojta and NDT-Bobath method. Additional methods of therapy of little patients include sensory integration method and MEDEKA method. The goal of the thesis is to present the methods of therapy of children suffering from cerebral palsy.

VOJTA METHOD

One of the most popular methods is neurokinesiologist diagnostic and therapeutic concept developed by the Czech neuropediatrician, Vaclav Vojta [12]. The main assumption of Vojta's concept is having genetically encoded, global locomotion pattern [14]. It is assumed that all mechanisms needed to change body position, verticalize and move are present since conception [14]. With gradually maturing central nervous system, the mechanisms mentioned above appear automatically in healthy children [14]. Motor activity is a response to stimulus and development disorders of central nervous system cause pathological reflexes and reactions of the body posture [1]. The goal of therapy is to stimulate central nervous system. Appropriate signals reach the brain, and then stimulate program of involuntary crawling and turning [15]. Motor response in children suffering from motor disorders appears only after stimulation of a few spheres at the same time[15]. The goal of Vojta therapy is to normalize muscle tone and activate muscle groups necessary for given motor function [14,16,17]. This motor pattern is encoded in the brain and with the development of cognitive functions of a child, it facilitates spontaneous motor activity [15] . This method stimulates psychomotor development and creates favourable conditions for development of correct posture and movement patterns [18]. The rules of therapy include appropriate starting point, selection of appropriate triggering zones, determination of direction of stimulation zones and repeating it [1]. The therapies with the use of Vojta method may be implemented a few days after birth. Central nervous system is very plastic at this period, which makes rehabilitation more effective [1]. The effects of therapy depend on the type of damage, regularity of therapy. Therapeutic program must be selected individually for every child upon thorough observation [13,14]. Vojta method has many supporters and opponents among physicians and physiotherapists, however, the most important issue that should be emphasized is the fact that therapy with the use of Vojta method is not painful [13,15]. Child's crying during the therapy is a protest against actions against his/her will and protest against excessive physical effort during exercises [13,15].

NDT – Bobath method

NDT Bobath concept was created by a physiotherapist, Berta Ottilie Bobath and her husband, paediatrician and surgeon, Karl Bobath. [19,20]. It is one of neurodevelopmental methods applied in paediatric therapy. The concept was developed mainly on the basis of the Bobaths' own research and observations of adult patients suffering from various types of dysfunctions of central nervous system and study of motor behaviours of children suffering from cerebral palsy[19,20]. The goal of the Bobaths was to find effective way of rehabilitation of children suffering from motor disorders, being a result of damage to central nervous system [14]. The goal of therapy is, among others, normalization of the size and distribution of muscle tone, inhibition of incorrect motor patterns and initiation (triggering) of correct reactions [22,23]. In the event of damage to immature central nervous system, gaining and improving particular functional skills is different. From the beginning, proper psychomotor development has features of diversity and multiple variants. All new functional skills are based on previous experiences [19]. This process in children suffering from cerebral palsy gradually reduces the number of postural and motor patterns and constant consolidation of the patterns of the socalled dynamic stereotypes [19] . As a result, functional reserves and compensatory capabilities are completely depleted. In the therapy with the use of NDT-Bobath method, we may affect the condition and distribution of muscle tone in various positions[14,15]. In the NDT-Bobath concept, there aren't any sets of exercises. The basic goal of rehabilitation is to build proper sensorimotor potential for individual psychomotor development of every child [19]. Therapeutic plan should be adapted individually to every child suffering from cerebral palsy and preceded with thorough analysis of clinical problem, accurate assessment of child's problem and defining the goals of a therapy [19]. Motor nursing is also an important element. It is a complement to the therapy and can be implemented soon after the birth of a child. Its task is permanent provision of appropriate motor and posture experiences during everyday nursing while, among others, putting children to bed, bathing, changing, dressing, feeding, carrying and playing with an infant [20,24]. The effectiveness of rehabilitation of children with the use of NDT Bobath method is affected by many factors, among others: clinical condition of a child, extent of brain damage, period of commencement of rehabilitation, regularity of rehabilitation, degree of education of a therapist and cooperation of a patient and parents in the process of rehabilitation [22,23]. There is some kind of hierarchy of goals in a therapy with the use of NDT Bobath method. Lowerorder goals are subordinated to higher-order goals [25,26] . Therapy with the use of NDT Bobath method is recognized throughout the world and it is one of the most popular therapeutic methods [20,21].

SENSORY INTEGRATION

A creator of sensory integration theory is A. Jean Ayres (psychologist and occupational therapist). She based her theory on the knowledge in the field of neurobiology, psychology, pedagogy and occupational therapy. This knowledge emerged in Poland in the beginning of the 1990s and has become very popular [27]. A.J. Ayres' method (SI) is not an independent method of rehabilitation of children suffering from cerebral palsy, but valuable complement to other methods, supporting the process of rehabilitation [27,28,29]. This method is aimed at mitigation of sensory integration disorders of the character of hypersensitivity or low sensitivity of specific receptors and motor reactions inappropriate to stimuli. Sensory integration therapy is based on detailed diagnostic tests, including standardized sensory integration tests, attempts of clinical observation and interview with the parents. Accurate determination of the type and degree of deficits allows to program individualized and effective therapeutic effects [28]. Stimulation of the sense of balance during various games on the suspending equipment (swings, platforms, trapezes, ladders) is the basis for sensory integration therapy. There are many exercises and games stimulating exteroceptive and deep sensation, sense of sight, hearing and smell. Children are encouraged to take actions that minimize developmental deficits. The degree of difficulty of these activities is gradually increasing. They can't be neither too easy nor too difficult [29]. Sensory integration therapy is usually a pleasure for a child, but it also requires child's commitment and sometimes many efforts [29]. The role of a therapist is to encourage the child to be active, even when some types of games and exercises make him/her reluctant or fearful [30,31].

MEDEK

MEDEK is Dynamic Method of Kinetic Stimulation. MEDEK method comes from Chile and its founder is Ramon Cuevas, eminent Chilean kinesiologist [33]. The goal of the method is to enable children suffering from psychomotor disorders of neurological origin to automatically develop motor reactions that they wouldn't be able to develop due to damaged central nervous system [32]. MEDEK therapy is based on gravitation and ability of the brain to stabilize the body in space [32] . Gravitation is regarded as the main stimulus stimulating neuromuscular system [32]. A child during the therapy does not have to either cooperate or concentrate. Child's motivation is not also important here[32]. MEDEK therapy is focused mainly on exercising movements necessary for sitting, standing and walking. Particular muscle groups are exercised through execution of postural and functional tasks, and not in isolation. Tight muscles are stretched in a dynamic way. This method is completely different than traditional

forms of therapy. The effectiveness of MEDEK method does not depend on the degree of brain damage, and therapeutic program must be adapted individually to every child [32].

SUMMARY

Rehabilitation of children suffering from cerebral palsy requires individual approach and involvement of many specialists and parents. Early diagnostics is the most important issue to initiate appropriate and comprehensive rehabilitation. Early intervention in the form of a therapy allows to inhibit incorrect motor patterns and initiate (trigger) correct reactions [22,23]. Regardless of selected method of supporting the development of children suffering from cerebral palsy, formulation of present and future goals of therapy is important. There are many methods of rehabilitation, also unconventional ones, which improve the effects achieved through main therapy[1]. Supporting the therapy with various forms of psychomotor support allows to develop all spheres of child life and provide new experiences [1]. Parents play the most important part in the process of rehabilitation, because it's their obligation to carry it out systematically. Increased awareness of the problem among parents and willingness to initiate therapy may give the best therapeutic effects [29].

REFERENCES:

1. Pogorzelczyk M , Gajewska E.: Terapia Dziecka z Mózgowym Porażeniem Dziecięcym z Punktu Widzenia Fizjoterapeuty. Polski Przegląd Nauk o Zdrowiu 1 (38) 2014, 43-47. 2.
2. Nowotny J., Czupryna K., Domagalska M.: Aktualne podejście do rehabilitacji dzieci z mózgowym porażeniem dziecięcym. Neurologia Dziecięca, 2009, 35: 53-60.
3. Stoińska B., Gajewska E., Pusz B., „Ocena rozwoju psychoruchowego noworodków z grup ryzyka". Ginekologia Praktyczna, 2000, 4, 37- 41.
4. Milewska A. , Mileańczuk-Lubecka B.,A. , Kochanowski J. , Werner B.: Analiza czynników ryzyka mózgowego porażenia dziecięcego. Nowa Pediatria 2011, 4, 79-84.
5. Gugała B, Snela S: Mózgowe porażenie dziecięce – rys historyczny i poglądy na temat istoty schorzenia. Pielęgniarka i Położna 2006; 3: 25-26.
6. Vojta V. (1988) Die zerebralen Bewegungsstörungen im Säuglingsalter, Ferdinand Enke Verlag, Stuttgart.
7. Volpe J. J. (1995) Hipoxic-ischemic encephalopaty: Neuropathology and pathogenesis [w:] J. J. Volpe (red.) Neurology of the newborn, Wyd.3. W. B. Sanders CO, Montreal, 279.
8. Ingram T. T. S. (1955) The early manifestations and course of diplegia in childhood, Arch. Dis. Cild, 30: 244
9. Matyja M., Nowotny J.: Zasady rehabilitacji dzieci z uszkodzeniami ośrodkowego układu nerwowego-aspekty teoretyczne i praktyczne. Zeszyty Metodyczno-Naukowe, AWF, Katowice 1996:8, 5–14.
10. Borkowska M.: ABC Rehabilitacji Dzieci – Mózgowe porażenie dziecięce. Warszawa 1989, 8.
11. Chochowska M., Zgorzalewicz-Stachowiak M., Sereda-Wiszowaty E., Wpływ wybranych czynników na skuteczność metody NDT-Bobath w usprawnianiu dzieci z mózgowym porażeniem dziecięcym. Fizjoterapia 2008, 16, 3, 8-24
12. Hellbrugge T.: Monachijska funkcjonalna diagnostyka rozwojowa, pierwszy rok życia. Antykwa, Kraków 1994, 200.
13. Sadowska L., Krefft A., Wiraszka A.: Ocena diagnostyki i stymulacji metodą Vojty dzieci z zaburzeniami rozwoju psychomotorycznego. [w:] Neurokinezjologiczna diagnostyka i terapia dzieci z zaburzeniami rozwoju psychomotorycznego. Red. Sadowska L. Wydawnictwo AWF, Wrocław 2001, 244.
14. Baryczkowska E., Hagner- Derengowska M.: Metoda studium przypadku w pielęgniarstwie pediatrycznym – wybrane zagadnienia z rehabilitacji dziecięcej. Wydawnictwo Continuo, Wrocław 2017,19-20.
15. Dytrych G., Kontrowersje wokół metody Vojty – spojrzenie terapeuty. Neurologia Dziecięca 20 0 8 , 17, 3 3, 59-62.
16. Hellbrugge T.: Monachijska funkcjonalna diagnostyka rozwojowa, pierwszy rok życia. Antykwa, Kraków 1994, 200.
17. Banaszek G.: Rozwój niemowląt i jego zaburzenia a rehabilitacja metodą Vojty. Ośrodek Wydawniczy Augustana, Bielsko Biała 2004, 114.

18. Sowa J.: Biofizjologiczne podłoże procesu rehabilitacji. [w:] Człowiek z niepełnosprawnością intelektualną. Tom II. Red. Janiszewska-Nieścioruk Z., Oficyna Wydawnictwa Impuls, Kraków 2004, 113.
19. Domagalska M., Matyja M.: „Podstawy usprawniania neurorozwojowego według Berty i Karela Bobath „. ŚAM, Katowice 1998.15-16, 128-130
20. Aly M.: „Dziecko specjalnej troski". Gdańskie Wydawnictwo Psychologiczne, Gdańsk 2002, 118-120
21. Mikołajewska E., Mikołajewski D.: „Metoda Bobath w rehabilitacji dorosłych i dzieci". Niepełnosprawność – zagadnienia, problemy, rozwiązania. Nr I/2016(18): 7- 24.
22. Cybula K., Kułak W., Wiśniewska E.: „Badania skuteczności metody NDT u dzieci z mózgowym porażeniem dziecięcym". Neurologia Dziecięca, 2009, 18, 35, 49-52.
23. Klimont L.: Principles of Bobath neurodevelopmental therapy in cerebral palsy. Ortop. Traumatol. Rehabil., 2001:3, 527–530.
24. Czupryna K ., Domagalska M., Nowotny J.: „Aktualne podejście do rehabilitacji dzieci z mózgowym porażeniem dziecięcym". Neurologia Dziecieca , 2009, 18, 35, 53-60.
25. Klinika Neonatologii UMP w Poznaniu [online][dostęp: 04.04.2016]. Dostępny w Internecie: < http://www.neonatologia.ump.edu.pl/pliki/Rekomendacje-Dzieci-z-grupryzyka.pdf>.
26. Nowotny J., Krauze M.: „Rehabilitacja lecznicza dzieci z chorobami układu nerwowego". PZWL, Warszawa 1981.
27. Bogdanowicz M: Integracja percepcyjno-motoryczna: teoria-diagnoza-terapia. CMPPP, Warszawa 1997.
28. Ayres J.: Sensory Integration and the Child. Western Psychological Services, Los Angeles 1979.
29. Bagnowska K., Falkowski M.: „Wybrane metody usprawniania dzieci z mózgowym porażeniem dziecięcym". Nowa Pediatria, 2013, 3, 119-123.
30. Maas VF: Uczenie się przez zmysły. Wprowadzenie do Teorii Integracji Sensorycznej. Wydawnictwa Szkolne i Pedagogiczne, Warszawa 2005.
31. Borowska M, Wagh K: Integracja sensoryczna na co dzień. Wydawnictwo Lekarskie PZWL, Warszawa 2010.
32. Mitroi S., „Stimulation od triple extention tone and orthostatic balance in the child with cerebral palsy throught exercises specific to MEDEK method". Discobolul – Physical Education, Sport and Kinetotherapy Journal 2016, 12, 1, 48-51.