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The use of neurorehabilitation techniques based on the currently used model of therapy in patients with neurological disorders

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Summary

Adherence to the rehabilitation guidelines of the patient brings measurable favorable conditions to achieve the intended effect of returning the patient to health. The present model of rehabilitation of a neurological patient is recommended to be based on the use of rehabilitation methods that prescribe the use of a tool called ICF (International Classification of Functioning), with which we assess its disability and set up a rehabilitation plan.

The ICF model assumes that it should follow a prescribed work schedule with the patient, which consists of 3 components: 1) structure 2) activity 3) participation. The whole medical team applies to the assumptions resulting from the above classification because of the improvement of the entire rehabilitation process.

The role of the physiotherapist is to inform all nursing staff to make important decisions relevant to the role of the patient's vision, including the correct placement of the patient, which significantly prevents the development of pressure sores and contractures.

Rehabilitation is designed to restore the patient's full fitness as quickly as possible and to allow him / her to stand up and, in the future, re-train his or her locomotive skills.

Key words: rehabilitation, ICF, neurorehabilitation

Introduction

During the evaluation of modern rehabilitation, attention should be paid to the occurrence of neurological diseases, which are still difficult to treat and time-consuming in rehabilitation processes.

Contemporary neurological rehabilitation is based on work with the patient, which uses neurorehabilitation methods consisting mainly of the regulation of muscle tone, the development of muscular ligament structures, the use of biokinematic chains, support surfaces and other important factors affecting the human movement.

One of the neurorehabilitation methods is the basic and very important ability to work with a neurological patient according to the NDT Bobath concept. This method uses ICF (International Classification of Functioning) assumptions, i.e. the International Classification of Functioning, through which we determine the state of health of the patient. Identification of a specific patient's dysfunction and functional disorders associated with it allows to create an appropriate and individual treatment plan for each patient, and allows to solve problems and adjust the goals of therapy that the person being treated will have to face [10]. Return to full activity will be associated with a change in the functioning of the patient as well as the surrounding environment [1,9].

The category list referred to the entire ICF structure shown below [27]:

Part 1. Functioning and Disability

1) The first component: Functions and Body Structures, which consist of the functioning of body systems and structure, i.e. body structure,
2) The second component: Activity and Participation, and thus functioning from the perspective of an individual and society, which consists of both performing simple activities and engaging in various forms of activity.

Part 2. Contextual factors
1) The first component: environmental factors with regard to the material components of the environment in which a person lives and in the context of its social environment,
2) The second component: personal factors, expressed in the potential of the person, as well as the sources of motivation.
The use of the above ICF components in rehabilitation influences the proper progress of patient rehabilitation, which results in the increase of its independence in social life.
Currently, in the rehabilitation departments, the majority of patients after the incident of stroke can be noticed. This has a significant and fundamental impact on the creation of special training for physiotherapists, thanks to which they can accelerate and facilitate the return of patients to broadly understood health, but above all it will affect the optimization of goals and work effectiveness, increase of competences and a more conscious look at the problems of functional disorders in patients after brain damage.

Research methodology

The aim of the work is to analyze international guidelines that are in force in the current rehabilitation of patients after a neurological incident. The work is a material analysis and is based on a selective qualitative assessment of research results published in 2010-2015.

The article consists of materials that have been identified and selected based on a review of works indexed in the PUBMED, SCOPUS, and EBSCOhost reference databases.

The work of physiotherapists in rehabilitation departments was mainly assessed, who use neurorehabilitation methods to work with patients, i.e. NDT - Bobath and PNF (proprioceptive neuromuscular facilitation, which uses movement patterns but also agonistic, antagonistic, and relaxing techniques.

In the review of literature, special attention was paid to the fact that the main task of comprehensive rehabilitation is to restore the patient to normal, everyday life and to obtain as much independence as possible in the performance of basic life activities.

Rehabilitation, according to the Polish concept, is characterized by the following features:

- Universality – rehabilitation covers all medical disciplines that are used in closed and open health care and which are available to all people who need it regardless of age, social status, nationality and religion,
- Comprehensiveness - medical rehabilitation includes all aspects, i.e. healing, psychological, social and professional,

- Continuity – this is a link between medical rehabilitation and social rehabilitation and vocational rehabilitation, and providing uninterrupted access to rehabilitation.
- Earliness – comprehensive bedside rehabilitation

should be introduced from the first day of hospitalization of the patient after the vascular / neurological incident [3, 4, 5, 6, 14].

The evaluation mainly uses multicentre work,
based on which it is possible to apply the guidelines to clinical practice, as well as in the field of various specialties concerning a selected disease entity. The rehabilitation procedure after stroke has been thoroughly analyzed taking into account the frequency of strokes in the rehabilitation wards.
The analysis of available publications and multicentre studies indicates that the implementation of modern neurorehabilitation has a direct impact on the acceleration of the patient's convalescence [8, 25].

Neurological diseases

Nowadays, there is a large tendency to occur in rehabilitation wards of people after brain stroke incidents, and this is one of the most common pathologies of the central nervous system, along with neurotraumatological episodes such as craniocerebral trauma and spinal injuries with spinal cord injury.
Complications occurring after a stroke are one of the most serious problems facing contemporary rehabilitation. In order to define a stroke, it can be stated that it is a clinical phenomenon, and it also

creates a difficulty in describing it in detail.

It has been noticed that we often have too little information about the stroke – about its epidemiology, risk factors, and the course of normal rehabilitation. Stroke according to the analysis of demographic databases has a high, third place, in terms of the possible causes of death just after cancer and diseases of the cardiovascular system [1, 5, 26].

The role of the family and neurological diseases

An important element is to draw attention to the direct impact of the family on the improvement of the patient's functionality, because according to statistical surveys of the patients' families, a significant proportion of them return home after the stroke and are then under their full protection. Many current scientific reports indicate that attention should be paid to the health condition of people who care for patients, because they will often bear the burden of a patient's illness, which in the long rehabilitation process will also affect their health and their quality of life [19 - 23].

It was noted that the majority of patients who do not follow therapeutic recommendations from physiotherapists during ongoing or completed hospital rehabilitation may subsequently result in structural disorders of the body and have a direct impact on the family psyche.

If relatives of people after neurological incidents adhere to the therapy proposals given by physiotherapists, as well as other members of the interdisciplinary medical team, who are part of the 24-hour patient care, it will facilitate and pave further rehabilitation

of the patient. It will also have a measurable impact on the health of people caring for patients suffering from neurological diseases [5, 7, 15, 16, 23, 27].

Upright standing and neurological diseases

It has been noticed that frequent upright standing in long-lying patients has a very significant impact on the acceleration of their recovery, as well as a positive effect on the cardiovascular and respiratory system.

By defining the upright standing, we mean a process that allows us to maintain the vertical position of the body. The use of upright standing should take place as early as possible in the rehabilitation phase, because it will protect the patient from upper respiratory tract infections, circulatory disorders, improved intestinal peristalsis and loss of both muscle and bone mass. We distinguish two types of upright standing: passive and active. The first one uses tables for upright standing that change the position of the patient from recumbent to more and more vertical. The tempo depends on the physiological response of the patient, but it is usually assumed that it is set at around 30 – 45 degrees within a short time of about 3 minutes. In addition, during the session we can carry out breathing exercises or active exercises of upper limbs, but also functional electrical stimulation of FES muscles using equipment such as Erigo®Pro.

Theoretically, this method of upright standing is less beneficial than active upright standing, because it is only a general preparation for vertical position, but it should be remembered that for many patients

it is impossible to carry out active upright standing.

The therapist should supervise the course of passive upright standing by reacting to changes in the patient's condition or disorders that may occur in orthostatic reactions. In active upright standing, the patient changes position from recumbent to reclining (additional pillow, raising the headrest), up to the flat sit. Then go to sit down with your legs down. At a later stage, the patient is put in the belay of a physiotherapist to a standing position. During active or passive upright standing, it is sometimes necessary to use stabilizing or relieving orthopedic care, such as braces or scales.

During the upright standing, one should also not forget about the prophylaxis of blood pressure measurement, whose correct systolic and diastolic values should be 120/80 mmHg, and an abnormal result is a decrease in systolic blood pressure by at least 20 or diastolic blood pressure by 10 mmHg in the upright standing test.

The test is performed during the change of positions from lower to higher in time intervals first after 1 minute, and then after 3.

It is extremely important to observe the patient in order to notice symptoms indicating orthostatic hypotension. Patients who, after prolonged supine, report symptoms of dizziness, syncope, feelings of darkness before the eyes, falls, unsteadiness in standing, walking, as well as pain in the back of the head and neck are referred to as orthostatic hypotension. If any of the above symptoms occur, the physiotherapist's reaction should be as quick as possible, which aims to move from a higher to a lower position and lift the lower limbs above the level of the head in order to improve the flow of blood to the patient's brain. Passive upright standing of patients after stroke

begins at an angle of 15 degrees in a time interval of 1 – 5 minutes. The person we consider to be fully upright is one that can stay in the vertical position for at least 0.5h without significant fluctuations in normal blood pressure, and without loss of consciousness.
After confirming that the patient has adapted to a standing position, the active upright standing begins [2, 19, 20, 21].

Improving the independence of neurological patients

Preparing the patient for full independence is a difficult and arduous process, an important task for the patient is to make him aware of the important role of being as independent as possible. Self-service is a physical process that involves creating the abilities and skills of a sick person in dealing with everyday activities, which also has a psychological dimension, because the deficit of physical fitness has a significant impact on the unfavorable mood and quality of life.
A patient with a neurological disorder is one who is able to deal with basic activities despite the deficits that he has. Making the patient move after a stroke becomes the basis for implementing reeducation of self-service activities in completely new operating conditions dictated by the existing neurological deficit. Independence in activities means coping while the patient does not need the help of other people or with a small insurance on their part, this can be done with the help of various facilities, such as orthopedic equipment. In a comprehensive rehabilitation process, it should be remembered not to replace the patient in particular activities, because it reduces the patient's participation in activation, which may develop passive attitude.

The use of simple exercises in the rehabilitation of a neurological patient may already have a slowing effect on learning how to perform daily activities. Initially, performing simple self-service activities may not be possible or it will take a long time, but it requires making many attempts, and the patient's persistence and pursuit of the goal turns out to be often statistically beneficial. With the help of medical staff and support of carers and family, the result of trials and exercises will be the independence and autonomy of the patient [28, 29].

Summary

In order to improve and gradually increase the level of functioning and psycho-physical fitness of a patient after stroke, an important role is to use systematic, functional and individually tailored rehabilitation according to the current NDT - Bobath and PNF guidelines.

Scientific publications on the subject of neurological rehabilitation describing the work of multi-center analyzes deal largely with epidemiology, risk factors and various methods of rehabilitation, which are used in people after a stroke, however, many scientific reports related to neurorehabilitation based on selected neurophysiological methods are still missing.

A considerable amount of scientific research raises the subject and indicates that attention should be paid to the quality of life of people after stroke and the impact of rehabilitation on daily functioning after a stroke incident, and the patient's influence on the family should also be taken into account. Achieving the intended goal, which is the

patient's return to full health is often associated with long-term rehabilitation, but currently trainings in which physiotherapists participate can significantly accelerate and improve this process.

According to the available data, the highest rated increase in functional capacity of patients is between 2 and 14 weeks of systematically conducted rehabilitation. An important point is the patient's return to physical and mental health, because in many cases it affects the patient's family, improving their mutual contact and coexistence in these difficult times.

After careful analysis of the appropriately selected publication, it can be concluded that the disease incident and subsequent distant deficit consequences require a long-lasting and individual rehabilitation process, which together with the emerging effects should be improved and corrected. These studies have allowed to broaden knowledge on the increase in motor performance depending on the time and type of therapy used.

Therefore, it is extremely important to expand knowledge and skills in the restoration of lost functions after the occurrence of any neurological diseases [17, 22, 23, 24].

Literature

1. Adamczyk K.: *Pielęgnowanie chorych po udarach*

mózgowych. Wydawnictwo Czelej Lublin 2003, 5-8

2. Adamkiewicz Bożena, Pyzik Marta; *Występowanie osteoporozy w chorobach neurologicznych* Aktualności Neurologiczne; 7 (2007) p. 242-245;

3. Bochenek A, Reicher M, „*Anatomia człowieka",* PZWL 1981

4. Campell J. E. Basic Trauma Life Support dla para medyków i ratowników medycznych (BTLS) Medycyna Praktyczna, ed. 1 Kraków 2006

5. Członkowscy A. i A.*: Leczenie w neurologii. Kompendium*. Chapter III Wydawnictwo PZWL Warszawa 2004 Kozera G., Nyka W.M., Siebert J., Current recommendations for the management of stroke., Forum Medycyny Rodzinnej 5 (2011) p. 147–155, ViaMedica 2011.

6. Członkowska A., Nowa definicja udaru. Stanowisko American Heart Association i American Stroke Asociation, Medycyna Praktyczna, (2013)

7. Grabowska-Fudala Barbara, Jaracz Krystyna; *Obciążenie osób sprawujących opiekę nad chorymi po przebytym udarze mózgu*; Udar Mózgu. Problemy Interdyscyplinarne 2006;8(1):42-47.

8. Grochmal S., Stan rehabilitacji neurologicznej, in: Stan rehabilitacji i potrzeby rehabilitacyjne osób o poszczególnych rodzajach niepełnosprawności, ed.: J. Kiwerski-A. Ostrowska, Warszawa (1994) p.18

9. Kowalik S., *Psychospołeczne podstawy rehabilitacji osób niepełnosprawnych*, Warszawa, Biblioteka Pracownika Socjalnego, (1996), p. 127–139

10. Krajewski S., Radziszewski R., Talar J., Sytuacja socjalna i

bytowa chorych z porażeniami czterokończynowymi po urazach rdzenia kręgowego, „Postępy Rehabilitacji”(1998) p. 21

11. Kuczyńska-Zardzewiały A., Członkowska A., *Co należy wiedzieć o udarze mózgu,* Bayer, Warszawa 2010

12. Kwieciński H.: Postępowanie w udarze mózgu-aktualne (2002) zalecenia European Stroke Initiative, Medycyna Praktyczna 2002/07

13. Laidler P.: Rehabilitacja po udarze mózgu. Zasady i strategia. Publishing house

14. Miller E. Ocena skuteczności wczesnej rehabilitacji po udarze mózgu, Wiad. Lek. 61 (2008) p. 252-257

15. Morawska Justyna Maria, Gutysz-Wojnicka Aleksandra, „*Problemy opiekunów chorych po udarze mózgu”,* Udar Mózgu. Problemy Interdyscyplinarne 10 (2008) p. 30-90.

16. Musiał P., Makowski K., *Udar mózgu, Na ratunek*, 2014: 8 (3)

17. Pasek Jarosław, Opara Józef, Pasek Tomasz, Sieroń Aleksander Ocena czynności życia codziennego w zależności od przebytego podtypu udaru niedokrwiennego mózgu i przeprowadzonej wczesnej rehabilitacji Udar Mózgu. Problemy Interdyscyplinarne 11 (2009) p. 41-49.

18. Prusiński A.: N*eurologia praktyczna. Wydawnictwo PZW*L, Warszawa (2005) p. 208-209

19. Raniszewska E., Basiński A., Kozera G., Gąsecki D., Siebert J. Pomoc przedszpitalna, transport chorego i postępowanie na oddziale ratunkowym w ostrej fazie udaru mózgu. In: Siebert J., Nyka W.M. (ed.). Udar mózgu: postępowanie diagnostyczne i terapia

w ostrym okresie udaru. Via Medica, Gdańsk (2007) p. 42–53.

20. Raniszewska E.., Kozera G., Gąsecki D., Nyka W.M. Optymalizacja postępowania z chorym w ostrej fazie udaru w warunkach przedszpitalnych i w szpitalnym oddziale ratunkowym: doświadczenia ośrodka gdańskiego. In: Jakubaszko J. (ed.). Szesnasta zima medycyny ratunkowej w Polsce. Polskie Towarzystwo Medycyny Ratunkowej, Wrocław (2007) p. 91–98.

21. Skwarcz A., Majcher P.: Współczesny model organizacji rehabilitacji wg Światowej Organizacji Zdrowia (WHO), in: Rehabilitacja i pielęgnowanie osób

22. Strepikowski A., Buciński A. „Udar mózgu-czynniki ryzyka i profilaktyka", Postępy farmakologii, 65, No. 1 (2009)

23. Sylwanowicz W., Anatomia i fizjologia człowieka, PZWL, Warszawa 1980

24. The European Stroke Organisation (ESO) Executive Committee and the ESO Writing Committee Guidelines for management of ischaemic stroke and transient ischaemic attack 2008. Cerebrovasc. Dis.,25 (2008) p. 457-507

25. Walowska J., Wachacka K., *Zastosowanie koncepcji Bobath u osób po udarze niedokrwiennym mózgu.* Rehabil. Prakt.2012 (2)Kjellström T., Norrving B., Shatchkute A. Helsingborg Declaration 2006 on European Stroke Strategies. Cerebrovasc. Dis. 23 (2007) p. 231–241.

26. Wawrzyniak Sławomir, Wawrzyniak Katarzyna; *Wpływ wybranych czynników społeczno-demograficznych na przebieg udaru niedokrwiennego mózgu;* Udar Mózgu. Problemy Interdyscyplinarne 8 (2006) p. 22-27.

27. Wilmowska-Pietruszyńska A., D. Bilski, op. cit., p. 5
28. Wiszniewska M., Kobayashi A., Członkowska A., Postępowanie w udarze mózgu Skrót Wytycznych Grupy Ekspertów Sekcji Chorób Naczyniowych Polskiego Towarzystwa Neurologicznego z 2012 rok, Polski Przegląd Neurologiczny, volume 8, No. 4(2012)
29. Wiszniewska M., Świderski W. i wsp. *Znajomość problematyki udarowej wśród osób dorosłych w Polsce*. Neur. i Neurochir. Pol. 34: (2000) p. 1101–1110.

Streszczenie

Wykorzystanie technik neurorehabilitacji opartych o obecnie stosowany model prowadzenia terapii u pacjentów ze schorzeniami o podłożu neurologicznym.

Stosowanie się do wytycznych rehabilitacji u pacjenta wnosi wymiernie korzystne warunki, aby uzyskać zamierzony efekt, którego celem będzie powrót pacjenta do zdrowia. Obecny model rehabilitacji pacjenta neurologicznego jest zalecany, aby opierał się o wykorzystanie metod rehabilitacji, które zakładają użycie do diagnostyki oraz terapii pacjenta narzędzie zwane ICF (International Classification of Functioning) za pomocą, którego ocenimy jego niepełnosprawność oraz utworzymy plan jego rehabilitacji.

Model ICF`u zakłada, iż powinno stosować się do założonego harmonogramu pracy z pacjentem, który składa się z 3 składników: 1) struktury 2) aktywności 3) uczestniczenia. Cały zespół medyczny stosuje się do założeń wynikających z powyższej klasyfikacji ze względu na usprawnienie całego toku rehabilitacji.

Rolą fizjoterapeuty jest poinformowanie całego personelu pielęgniarskiego, aby podejmował ważne decyzje istotne z roli widzenia pacjenta obejmujące prawidłowe ułożenie chorego, które w znaczący sposób zapobiegają powstawaniu odleżyn i przykurczom. Rehabilitacja ma na celu jak najszybsze przywrócenie pełnej sprawności pacjenta oraz umożliwienie jego pionizacji, a w dalszym toku jego reedukację umiejętności lokomocyjnych.

Słowa kluczowe : rehabilitacja, skala ICF, neurorehabilitacja