

PhD Romanna Rudenko

Lviv State University of Physical Culture, Ukraine

**ESTIMATION OF THE EFFICIENCY OF PHYSICAL THERAPY
FOR DISABLED ATHLETES
IN UKRAINIAN AND OVERSEAS PUBLICATIONS
OCENA EFEKTYWNOŚCI FIZJOTERAPII DLA NIEPEŁNOSPRAWNYCH
SPORTOWCÓW, W UKRAIŃSKICH I ZAGRANICZNYCH PUBLIKACJACH**

Abstract

The article deals with the issues concerning establishment and advance of physical therapy for the disabled athletes. Analysis of the research dealing with the application of sports and physical rehabilitation measures for the disabled athletes has been carried out. It has been ascertained that locomotor activity helps to restore fitness shape, promotes development and refinement of physical, mental, functional and volitional skills, facilitates integration of the impaired athletes into the society. Expediency of special exercises, remedial massage modalities as well as hydrotherapeutic procedures for the disabled athletes has been substantiated.

Keywords

Physical therapy, disabled athletes, special exercises, remedial massage, hydrotherapeutic procedures.

Streszczenie

Niniejszy artykuł opisuje problematykę dotyczącą ustalania oraz realizacji fizjoterapii niepełnosprawnych sportowców. Przeprowadzono analizę badań dotyczących wykorzystania sportu oraz rehabilitacji. Na podstawie tej analizy ustalono, że aktywność lokomotoryczna pomaga w przywróceniu sprawności fizycznej, wspiera rozwój i poprawia sprawność fizyczną, umysłową, funkcjonalną a ponadto wzmacnia wolę, wspomaga powrót i integrację niepełnosprawnych sportowców ze społeczeństwem. Zasadność specjalnych szkoleń, procedury masażu leczniczego, jak również procedury terapii wodoleczniczej dla niepełnosprawnych sportowców znalazły swoje potwierdzenie.

Słowa kluczowe

Fizjoterapia, sportowcy niepełnosprawni, ćwiczenia specjalne, masaże lecznicze, procedury terapii wodoleczniczej.

Introduction

Wheelchair sports as well as sport activities for the disabled athletes in general have gained its popularity of late. Quite a number of competitions in various kinds of sport are held, European and world championships, Paralympic Games among them. Advance of sport activities for the disabled athletes possesses a humanistic nature, which implies favourable conditions for gradual transitions of impaired people to social activities involvement, providing psychological adaptation and integration of athletes with vision or hearing impairments, muscular skeletal system dysfunctions, mental or physical abnormalities. Disabled athletes' training system has scientifically substantiated theoretical basis. Involvement of handicapped persons into physical culture and sports activities is considered to be the most expedient and effective means of physical rehabilitation. Engaging in exercises implies administration of means and methods of physical education aimed at the development and improvement of vitally and professionally significant motor skills and abilities required for gaining everyday self-sufficiency, psychological freedom and professional efficacy. In the majority of cases an underlying disease is accompanied with the whole range of associated illnesses, which necessitate in taking into account various indications and contraindications concerning certain types of physical and psychoemotional loads. Special attention is paid to nonmedicamental therapy, physical rehabilitation means being among them [6, 7]. Disabled persons' rehabilitation could be regarded as a set of therapeutic, pedagogical and social measures aimed at restoration (or compensation) of the body functional abnormalities.

Analysis of the latest research and publications

Analysis of the latest scientific publications validates availability of the research dealing with disabled athletes' rehabilitation. For example in 2010 professor Joel A. DeLisa, M.D., promoter of the Foundation Research Center, Chairman of the Medical Reconstruction and Rehabilitation Board of the Medical School in New Jersey reissued a manual under the title "Reconstructive Medicine: principles and practice". One of the chapters is devoted to practical physical therapy recommendations for various diseases and dysfunctions with special attention given to interrelation of physical therapy and exercise. The works of Polish scientists Zadarko E., Barabasz Z. (2009) emphasize the significance of locomotor activities for healthy lifestyle. Sir Ludwig Guttmann from the hospital in Stock-Mandeville (England) introduced radical changes into the theory and practice of disabled individuals' rehabilitation, shifting the accent on practicing sports. He described in particular that physical therapy improves general fitness as well as specific physical rates of the patients. Disabled individuals with musculoskeletal impairments get to be actively involved into practicing sports. The Stock-Mandeville Rehabilitation Centre became the venue for implementing a special sports programme for the patients with spinal cord injuries as an indispensable part of their multimodality therapy. In 1966 Sir Guttmann founded the British Association of the Disabled Athletes.

Kahlmeier S, Rocioppi F. (2006), investigating well-being and health in Europe have claimed the lack and significance of motion and exercise for the Europeans. A lot of people with various inherited or acquired physical impairments still preserve numerous skills and abilities that have no direct connection with their fundamental illnesses. This fact alone gives rise to the possibility of vigorous engagement in sports activities for the majority of the halt and the lame.

Analysis of the energy expenditure indices during walking after prosthetics alongside with practicing mountaineering were investigated by Dr. Paed, Dr. Jan Kalal, CSc, MU Dr. Natalija Vinakurau, Dr. Pavel Kolář (2009), (Charles University, Prague, Czech Republic).

V. V. Khramov (2008, 2010) (Russia) determined the role of physical culture and sports activities in physical therapy of disabled athletes, as well as the role of exercise in improving the living standards of impaired individuals.

Analysis of scientific publications testifies the availability of certain research considering the problem of disabled athletes' rehabilitation. Issues of technical training optimization for track-and-field athletes with cerebral palsy consequences turned to be the object of investigations of A. Perederiy (2004, 2006). Specific planning characteristics of the palsied football players training became the focus of attention of S. V. Ovcharenko (2005). O. Romanchuk, M. Sorokin (2005) investigated the vegetative regulation specificity of cardiopulmonary system in basketball players with spinal cord traumas by means of physical rehabilitation. O. P. Romanchuk, M. Y. Sorokin, B. G. Sheremet (2005) examined the external respiration tension in basketball players with spinal column traumas. Comparative analysis of professional traumatism in common basketball and wheelchair basketball has been carried out by P. Mustafins, I. Shybria (2006). Ways of psychomotor functions development in mentally retarded teenagers engaged in speed skating have been studied by V. Iliyina, N. Rubtsova, K. Skorosov (2006). G. M. Boiko (2005 - 2007) and O. M. Maksymova (2005) focused their attention on theoretical and methodological aspects of medical and psychological classification procedure of athletes belonging to various nosological groups. T. P. Viskovatova (2002, 2004) considered the issues of disabled athletes' psychological training. M. M. Lynets et al. (2002) proved the necessity of corrective and rehabilitative programme elaboration for the disabled athletes aimed at the perfection of their sports training. O. G. Tomashchuk (2010) developed a set of recommendations for professional training of future adaptive physical training experts who work in specialized sports centres for the disabled. A. I. Kravchenko, V. I. Honcharenko (2008) tackled the problem of the efficiency restoration in handicapped footballers by means of acupuncture. R. Y. Rudenko has initiated the research on the elaboration and application of the corrective remedial massage for disabled athletes according to her own technique (2011 – 2013). Research of T. V. Boytchuk (2008 – 2012) is focused on the problems of diagnostics and physical therapists' clinical training.

Long-term experience of this country's and foreign scientist's investigations prove that physical therapy by means of sports training turns to be

the most effective methods for the disabled athletes rehabilitation [2, 3]. Regular trainings, participation in competitions enhance the disabled persons' adaptation to changed life conditions, enlarge their functional abilities and promote fitness. Moreover, exercises on a regular bases are conducive to the development of locomotor coordination, improvement of cardiopulmonary, digestive and excretory systems, have a positive effect on the disabled psyche, mobilizing them to withstand the disease, restore their feeling of social identity [11, 12, 24]. Physical rehabilitation of disabled athletes facilitates their compensatory mechanism development, restores their manual dexterity in the setting of every day professional education and reeducation and enables them to be socially needed and useful. Finally, physical therapy involvement of the disabled persons helps them to preserve their family unity, although their impairments restrict their ambulation and self-grooming [4, 16].

Object of the research: to investigate the process of the establishment and advance of physical rehabilitation for the disabled athletes as it has been depicted in various scientific publications.

Research tasks:

1. To summarize the experience of physical therapy administration for the disabled athletes.
2. To substantiate the correlation between the adaptive physical culture activities, doing sports and physical rehabilitation measures for the disabled athletes.

Methods of the research: analysis and summarizing of scientific theoretical and methodological sources on the problem of the disabled athletes' rehabilitation (content analysis, systems analysis).

Results of the research and their interpretation:

The main purpose of the involvement of the disabled individuals into regular exercises is to restore the lost contacts with the surrounding world, to create necessary conditions for social integration, for job satisfaction and health improvement. Besides, engaging in sports assists in maintaining mental health of this category of the country population, enabling thus their social adaptation and physical rehabilitation [5, 13]. Some nations popularize sports among the halt and the lame for leisure, recreation and communication, for keeping good physical form and general fitness.

People with physical impairments usually have problems with independent ambulation, which causes cardiovascular and pulmonary system disorders [17, 18]. World Programme of Actions in support of the disabled individuals reads: "Sports for people with physical impairments meet its recognition of late. The state administrative boards of all the countries should support all kinds of the disabled people's engagement in sports activities through appropriate financial

insurance and proper organization of these activities". Provision of equal rights and conditions for the disabled pertaining to their engagement in physical culture and sports activities is considered to be the major attainment of the developed countries [19]. It is commonly acknowledged that the nation's concern and care of its disabled compatriots has become a criterion of the country's cultural and social maturity.

Engagement in vigorous exercises, participation in sports competitions are indispensable forms of communication [1]. Sports contests help to restore psychological balance, take off the feeling of isolation, return self-confidence and self-respect and enable to return to active way of life. Involvement of as many disabled people as possible into sports activities turns to be an effective means of their adaptation and integration into the society because taking up sports implies the creation of psychic attitude necessary for successful socially useful work [9]. Physical culture and sports activities is an effective and in some cases the only way of physical rehabilitation and social adaptation of the disabled people [14, 20]. While administrating physical therapy modes the emphasis is made on the retrieval of alternative means of restoration, applying methods and techniques that bring together physical and spiritual principles [21, 23]. It is physical rehabilitation mainly that integrates these aspects to enhance locomotion and mobility skills [24]. Nevertheless, certain physical therapy modalities like corrective remedial massage or hydro and kinesitherapy still meet not enough approval as compared to practicing sports [21].

Special remedial techniques exercise a local influence upon an injured or affected organ thus playing an important role in the disabled athletes' rehabilitation. For example corrective massage application is aimed at leveling of physical, psychic disorders peculiar to the disabled athletes belonging to various nosological groups [20, 21]. Physical abnormalities and disorders present a real challenge for rehabilitators during massage procedures implementation. To provide corrective orientation of massage it is necessary to develop certain methods and techniques which allow for fundamental and concomitant diseases, taking into account physical fitness of the athletes who have visual, hearing or locomotor impairments. Selective approach to massage modalities enables to apply them according to the muscles' condition [21].

Gymnastic exercises on water for the disabled athletes are an effective means of health promotion. Such physical properties of water like thermal capacity and thermal conductivity, which are twice as big as on land, result in the fact that a person in water emits 50-60 percent larger amount of heat as compared to that released on land. This means that expenditure of energy due to accelerated metabolic processes grows noticeably. Significantly big water density force to perform movements in a more slow and smooth manner, at the same time experiencing considerable load bearing [15]. Aqueous medium, in which the remedial movements are performed, exerts additional effect upon the body, creating specific conditions for the procedure administration. Several essentials should be considered and applied purposely.

◆ *Hydrostatic pressure* (the pressure caused by water weight applied to every bearing point of the body immersed in the water) acts equally in all directions and is analogical to the depth of body immersion. Usually during hydro and kinesitherapy procedure various parts of the body withstand the pressure amounting to 70-100 mm of mercury column. Physiological effect of water pressure is multidirectional. The pressure upon thorax and abdomen, while the patient is immersed into water up to his neck, makes the inhalation more complicated because respiration is accomplished with counteraction to resistance. At the same time exhalation becomes easier. Blood circulation becomes more intense due to reinforced blood derivation to heart as a result of external blood vessels compression and because of relative stagnation of the circulation in the limited thoracic space. This bearing load (within physiological rates) is easily compensated by normal functioning of cardiovascular system at the expense of minute blood volume. It is necessary to keep in mind that later on additional load from exercise itself will inevitably join in. Studies indicate that even relatively slight movements in water increase the minute blood volume by 34 percent, whereas stroke blood volume grows by 31 percent [35]. On the other hand one needs to consider beneficial effect of hydrostatic pressure upon muscles' work under water. Compression is conducive to alleviation and acceleration of blood flow to the heart due to its impact upon the peripheral venous vessels. Favourable mechanism of hydro and kinesitherapy effect upon lower extremities' venous lesion is quite vivid and "treading water" modality is highly recommended for such cases [14].

◆ *Buoyancy of water* stipulates for the body weight loss in aqueous medium. This phenomenon undoubtedly creates favourable conditions for musculoskeletal system training. The loss of weight effect is utilized for exercising weak muscles. Even the smallest muscular active contraction of the limb allows the full range of movement under water. Weight loss during hydro and kinesitherapy creates favourable conditions for graduated physical exercise of the joints as well as bearing function of the whole lower limb.

◆ *Water temperature* might fluctuate depending upon the type of injury or disease, clear therapeutic objective of the procedure and upon patient's state of health. Warm water at a temperature of 36-37 degrees centigrade decreases muscle tone and has a relaxing effect. Body movements in the water at that temperature in various spasticity cases are performed with much more ease, better coordination and are more varied. The mobility of the contracted joints increases due to low muscle tone and softening of the tissues, which cover the joints. Scar tissue is especially yielding. Water at this temperature improves blood supply, peripheral arterial especially, facilitates tissue trophism and decreases swelling [12, 15]. Water at 36,5-37 degrees centigrade alleviates pain. Underwater gymnastics at this temperature is applied in various joint diseases. Exercises used for the above mentioned purposes are mainly of a passive or passive-active type. Lower water temperatures are not advised because of the possibility to catch cold. Aqueous medium with 34, 32, 30 degrees centigrade temperature and lower combined with physical exercise in certain cases facilitate metabolism and is applied in arthritis or

obesity. Water at lower temperatures stimulates nervous system, trains cardiovascular system and supports resistance to the cold.

♦ *Chemical composition of water* is of less importance in hydro and kinesitherapy administration. The procedure is usually carried out in artificially heated tap water. In certain cases sulfide, radon or carbonaceous mineral waters are used at rheumatic diseases, at locomotor, nervous and cardiovascular systems dysfunctions.

♦ *Psychotherapeutic effect* of exercises in water occurs to be very supportive in many cases.

♦ *Stabilization* during exercising in water is of great importance and concerns various methods of underwater gymnastics. Stabilization (fixation) of the body and its separate parts in water could not be accomplished effectively enough due to water buoyancy, except for small body segments like fingers, foot or wrist.

Hydro and kinesitherapy for disabled athletes impose general strengthening effect conducive to muscular and functional systems development [22].

Conclusions

Promotion of work with disabled people in the sphere of physical culture and sports undoubtedly enhances the advance of the society humanization, changes people's attitude to this group of population, being thus of great social importance. Further advance of the adaptive physical training and physical rehabilitation of disabled individuals is necessary for boosting cultural and spiritual level of the society.

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