

# THE INFLUENCE OF ADAPTIVE PHYSICAL EDUCATION ON PHYSICAL HEALTH AND FITNESS OF STUDENTS WITH DISABILITIES

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## **Abstract**

The article presents the results of the performed analysis of physical health and fitness of students with disabilities during their study at university if they use, in accordance with their medical conditions, the structural and functional technique of adaptive physical education proposed by the authors. The long-term experimental research with the proposed authors' techniques has shown positive changes in the studied students' physical health and fitness, which depend on the content and forms of their adaptive physical education. The main directions of improvement of physical health and fitness of students with disabilities during the classes of adaptive physical education are substantiated.

The obtained results prove that the variety of medical conditions, accompanying disorders, lack of motivation for motor activity require a personal approach to a person with disabilities, selection of an individual path for his/her physical development. The results testify also to integration of students with disabilities into the student environment where they feel comfortable and more confident.

**Keywords:** *students with disabilities, adaptive physical education, motor activity, medical conditions, physical exercises.*

## **Introduction**

Current progressive changes in the world, developed information and communication technologies, transition to market economy, demographic changes as for employment and health care are changing attitudes of the world and the European community, governments and non-governmental organisations to the problems of people with disabilities as people having all human rights and fundamental freedoms, as well as to realisation of these rights without any restriction or discrimination. One of the conditions for integration of people with disabilities into the society is the opportunity for them to receive a university education. Studies of the modern employment market show that university graduates with disabilities have 80% more chances to find a job than such people without obtained higher education.

Analysis of the recent studies shows that university physical education as a compulsory academic discipline for students with disabilities exists only as a declaration, but in reality it is not oriented towards fulfilling the social order to train a young specialist having sufficient health, necessary physical education and physical fitness to meet the qualification requirements of his/her chosen profession at all. A short time ago, physical education was based on the approach determining average, uniform physical requirements for all, which was against the idea of individual development of each person. The most progressive universities of the country have changed their educational concept to the one aimed at a person-oriented, active approach, acceptance of cultural norms and values, with creation of conditions for positive changes in social and physical positions of every individual.

Achieving a certain level of a person's physical development by means of physical education requires the optimal organisation of a specialised pedagogical process, i.e. the adaptive physical education aimed not only at developing physical qualities and abilities of young people with different medical conditions. It is necessary to use different means and methods of adaptive physical education to correct physical impairments, to stimulate necessary compensations, to implement prevention, i.e. to organise complex rehabilitation for integration of students with disabilities into society. As for students with disabilities, this approach is the only correct one because their different medical conditions, accompanying disorders, lack of motivation for motor activities lead to necessity in a personal approach, an individual path for physical development. Based on this, the results of scientific studies of local and foreign scientists concerning means and methods of adaptive physical education and adaptive sports (Sherrill, 2004; Winnick, 2010), exercise forms and the stages of motor activity formation for people with disabilities (Birrer & Sedaghat, 2003; Adyrkhaiev, 2014b) were used in motor activity development of students with disabilities; and we believe that the presented approach is reasonable because of the characteristics of the studied group and the research focus (Cheatham, Smith & Elliott, 2013; Adyrkhaiev, 2016). Each student with disabilities has certain characteristics and functional limitations complicating his/her learning in the integrated environment and his/her socialisation. To ensure equal access of such people to education, special methods, programmes, pedagogical technologies and adaptive technical means must be introduced in the educational process (Lieberman, Houston-Wilson & Kozub, 2002; Adyrkhaiev, 2014a). At the same time, person's motor activity lies in his/her genes and is related to the fundamental capacity of living beings, i.e. biological adaptation to life conditions and area (Apanasenko, 2007). However, the modern conditions of life and professional activities have reduced motor activity practically to zero, created a situation that motor activity is normally not in demand. Hypodynamics and physical inactivity are already integral attributes of a modern civilised life, one of the main factors causing deterioration of the population's health.

Reduction in the physical activity volume and intensity, low muscular work, motor activity simplification and impoverishment lead to deterioration of the functioning of both person's internal organs and systems and his/her psyche. Movement deficit of a person with disabilities is usually triggered by his/her medical condition. Therefore, sight or hearing impairments, amputations, cerebral palsy, cardiovascular diseases, diabetes mellitus are a serious barrier to adequate motor activity. We underline it is a barrier, but not a ban or exclusion (Thompson, 2001; Birrer & Sedaghat, 2003; Winnick, 2010; Adyrkhaiev, 2014b).

The authors' observations and experience of work with students having disabilities prove that such students, if they acquire appropriate theoretical knowledge and, most importantly, if

they wish, they can independently organise available forms of motor activity (except in severe cases). Nevertheless, the problem is that the idea on mandatory motor activity restriction at any disorder still exists in the public consciousness and, unfortunately, among experts (doctors, teachers, psychologists, representatives of traditional physical education) there is a belief only in pharmacological and other medical means and treatment methods, all-powerful biological supplements, stimulants, etc. This, on the one hand, is due to an inadequate cultural level of society and, on the other hand, because of advertising campaigns of manufacturers of the above-mentioned goods. Insufficiency of movement is treacherous because daily negative morpho-functional changes are hardly noticeable. However, the negative cumulative effect leads to the following: functional activity of organs and systems decreases and regulatory mechanisms are disrupted; atrophic and degenerative changes in the musculoskeletal system occur; decrease of muscle training negatively affects blood circulation, digestion, respiration; cardiac activity decreases, which leads to destructive atrophy changes and energy changes; the vital capacity of the lungs and pulmonary ventilation decreases both at rest and, especially, at physical loads; ortho- and antiorthostatic resistance deteriorates sharply, so the reflex mechanisms regulating the vascular tone is disturbed; thermoregulation is impaired and so on. Deficiency of movement adversely affects development of all components of the human genetic developmental programme and viability of the human body, i.e. it's not just about physical characteristics, but also about intellectual, emotional-volitional, cognitive ones (Sherrill, 2004; Cheatham, Smith & Elliott, 2013; Adyrkhaiev, 2014a).

Thus, one of the main problems of adaptive physical education for students with various medical conditions is the fighting against inactivity consequences, activation of all preserved body functions and systems, disease prophylaxis. We emphasise that practically there are no medical conditions (with the exception of acute stages) for which adaptive physical education is ineffective. An effect depends on the correct choice of exercises with the required intensity and schedule, intervals for rest and other factors.

Lack of motor experience, inertness of character and behaviour, lack of will, social awkwardness, uncertainty about success, absence of family traditions, lack of special knowledge, necessary information, special literature, sports and health programmes and recommendations, lack of a place to study, etc., all these problems still exist for students with disabilities; however, at the same time, different types of motor activity are unique forms of integration that cannot be replaced by other activities of people with disabilities.

**The object of the research:** adaptive physical education of students with disabilities during their studies at university.

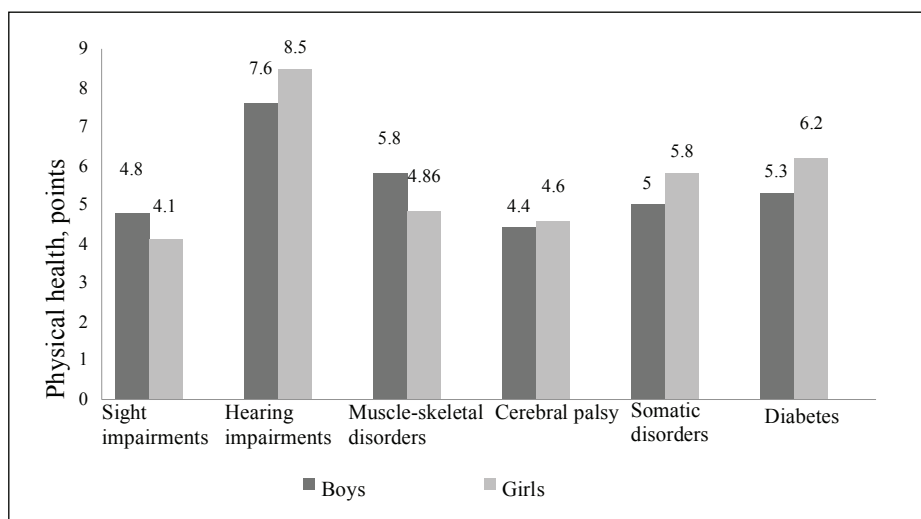
**The aim of the research:** to determine influence of adaptive physical education means and methods on physical health and fitness of students with disabilities during their studies at university.

**Methods of the research:** to assess physical health of students (boys and girls) with disabilities, the technique proposed by G. L. Apanasenko for quick physical health assessment (Apanasenko, 2007) was used. This technique allows an expert to obtain information on separate indicators and their ratio, namely: standing height (cm), body weight (in the morning with an empty stomach) (kg), vital capacity of lungs (ml), handgrip test (kg), heart rate (bpm) at rest, blood pressure (mmHg) and the heart rate recovery time to the original level after 20 squats in 30 seconds. The following levels of physical health were assessed: low, below average, average, above average and high. Each physical health level was assessed in points. This technique is quite informative and widely used in practice in physical education; it does not require a lot of energy from students with disabilities. Also, the state system of requirements

for tests and assessment was used to test physical fitness of students with disabilities. The level of development of physical qualities was assessed using these methods (see Table 1). To improve the quality of physical education of students with disabilities, the author's structural and functional techniques of adaptive physical education was used (Adyrkhaiev, 2016). The results of the performed comparative analysis of physical health and fitness testing indicate that training programmes using various innovative tools and forms of adaptive physical education significantly influence the studied indicators.

**Participants of the research:** the research involved students with disabilities (2nd and 3rd disability categories) having sight or hearing impairments, musculoskeletal impairments, cerebral palsy, diabetes and somatic disorders. 644 students were examined: 337 of them were boys and 307 were girls with the average age of 18 to 25 years. All of them were students of the Open International University of Human Development "Ukraine" (Kiev, the Ukraine).

**Research results and their discussion.** We have determined physical health and physical fitness of students with disabilities by the above-mentioned indicators and tests and have revealed the dynamics of motor abilities during study years; these abilities were under correction in the experimental group. The exercise sets were chosen with regard to their degrees of complexity: simple physical exercises, medium complexity and complex exercises. Each degree of complexity had the same algorithm of actions: an individual approach in classes with a focus on health gaining. This approach was expressed in the differentiation of motor tasks, means and requirements to physical activity. Improvement of physical health and physical fitness for each student with disabilities was the main evaluative criterion. We also used the following additional criteria: daily physical exercises, a gradual increase in their volume and intensity, transition from one complexity level to another, acquisition of knowledge and skills used in practice by students. Attention is focused on the systematic repetition of previously learned exercises. The initial level of the indicators of physical health and physical fitness of students (boys and girls) with disabilities at the beginning of the pedagogical experiment is shown in the figures (see Fig. 1, Fig. 2).



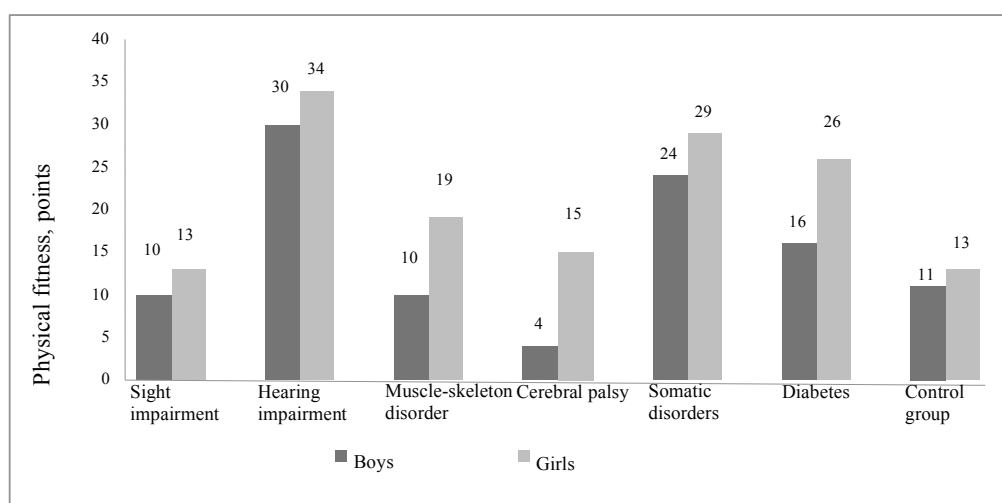
**Fig. 1.** Physical health of students with disabilities at the beginning of the pedagogical experiment

Legend: 3 or less points as low; 4–6 points as below average; 7–11 points as average; 12–15 points as above average; 16–18 points as high (levels of physical health).

The obtained results show that the boys-students with sight impairment, muscle-skeletal disorders and cerebral palsy, somatic diseases and diabetes mellitus admitted to the university had the below average levels of physical health (the boys with cerebral paralysis had 4.4 points, the students with vision impairments had 4.8 points, 5.0 points showed the boys with somatic disorders, the boys with diabetes had 5.3 points and the students with muscle-skeletal disorders were as close to the average level of physical health development as 5.8 points). The average level of physical health of the boys-students with hearing disabilities was 7.6 points. The assessed physical health of the disabled girls-students was below average and only the girls with hearing disabilities (8.5 points) and diabetes mellitus (6.2 points) showed the average level of physical health.

To unify the tests and maximise their integration into the European system, the Ukraine has developed the state system of requirements for tests and assessment intended for physical fitness. This system includes a separate section dedicated to students. The developed programme of tests includes physical exercises that allow a person to assess physical qualities: speed, flexibility, strength, endurance, agility (coordination). All these estimations give an adequate idea on students' physical fitness. Pedagogical testing of physical fitness students with disabilities was carried out in accordance with the standard of the state system of requirements for tests and assessment for healthy students. There is no a similar system for students with disabilities.

The initial data on physical fitness of students with disabilities shows that there are no significant differences between the students in different medical conditions as for majority of indicators ( $P < 0.05$ ) (see Fig. 2). Serious differences were revealed for indicators of physical fitness for the students with hearing and vision impairments. Physical fitness of the students with hearing problems corresponds to the average level for most indicators, but physical fitness in the other group corresponds to the low level.



**Fig. 2.** The initial physical fitness of students with disabilities

Legend: 45–50 points as high; 35–44 points - above average; 24–34 points as average; 15–24 points as below average; 10–14 points as low (physical fitness).

The students with cerebral palsy showed the below average level of physical fitness. Moreover, they were not able to perform 70% of normative tests. The boys with a vision

impairment, muscle-skeleton disorders and cerebral palsy had the low level of physical fitness. It was especially true for the boys-students with cerebral palsy. The manifestation of their motor abilities can be assessed only by four tests: strength, coordination, flexibility and the ability to swim (their points were, respectively, 10, 10 and 4). The average level of physical fitness was shown by the boys-students with hearing disabilities, their motor abilities were assessed by all tests. Their results, as for coordination and ability to swim, were high. The boys with somatic disorders showed the average level (24 points) of their motor abilities for all tests. The boys with diabetes mellitus obtained 16 points for their motor abilities, which corresponds to the below average level. The girls with disabilities had higher levels of physical fitness than that of the boys. Thus, physical fitness of the girls with hearing impairment corresponded to the average level (34 points). They performed all normative tests with “good” marks. The girls with somatic disorders and with diabetes also had the average level of motor abilities. Their points were 29 and 26, respectively. The girls-students with muscle-skeletal disorders and cerebral palsy had the below average level (19 and 15 points, respectively). The girls-students with cerebral palsy did not perform the endurance and coordination tests. The girls with vision impairments had low physical fitness (13 points). They did not perform the endurance and strength tests.

The performed study of dynamics of physical health and fitness of the students with disabilities during their university studies after introducing the structural and functional technologies of adaptive physical education into the educational process had indicated that gradual positive changes were observed for most indicators every year. Significant positive changes (their percentage estimations differ for different cases) in physical health and fitness of the students with disabilities were noticed at the end of the long-term pedagogical experiment (see Table 1).

**Table 1.** Comparative influence of means, methods and forms of adaptive physical education on physical health and physical fitness of students with disabilities (% of changes against the original level)

Indicators of physical health and fitness	Boys/ girls with different medical conditions					
	sight impairment	hearing impairment	muscle-skeleton disorder	cerebral palsy	somatic disorders	diabetes
Level of physical health, points	58/68	24/18	85/60	41/36	82/69	67/57
Running 3000 m, min., from Running 2000 m, min., from		5/8				
Swimming for 12 min., m	24/15	20/16	10/21	-	15/14	49/79
Pulling on the crossbar, times	55/-	50/-	54/-	-	68/-	73/-
Arms flexion/ extension lying on the floor, times	53/79	24/62	35/67	23/37	26/37	29/38
Trunk lifting forward into the sitting position in 1 min., times	42/24	17/34	42/41	-	36/57	37/45
Standing long jump, cm	11/12	9/4	10/9	-	12/13	16/13
Bent suspension, sec.	63/39	52/3	24/57	23/47	20/24	14/91
Shuttle run 4x9 m, sec.	-	7/4	-	-	11/11	4/10
Trunk torsion forward from the sitting position, cm	49/25	25/27	100/59	85/46	31/18	74/23
Swimming, m	10/44	22/12	6/5	16/26	31/19	56/25



The adaptive physical education for students with disabilities was organisationally and pedagogically supported with the background of the scientific data presented by local and foreign specialists, as for the means and methods, exercise forms and stages of motor activity formation for people with disabilities (Winnick, 2010). The adaptive physical education includes health and educational tasks for each lesson, as well as introduction into physical education of health and innovation programmes using sports technologies. Lessons in sports most suitable for students with different medical conditions are necessary; these lessons evoke their interest in motor activity. Different forms and types of physical exercises and sport activities provide the following: prevention of physical inactivity and hypodynamia by increasing necessary physical activity; enlargement of the reserve capabilities of the respiratory and cardiovascular systems; increase of organism's general resistance to various diseases. The introduced individual assessment system for each student with disabilities contributed to their motivation to make exercises and receive a higher rating at performing motor tests available to them. Differences in physical health, physical fitness, and mental state were the basis for the differentiated approach used for students with disabilities to determine their optimal physical activity. Peculiarities of medical conditions were taken into account during their adaptation to systematic physical exercises and sports activities.

### Conclusions

1. The study results show that physical education, health and sports activity of students with disabilities gradually acquire the status of objective necessity.
2. Positive changes in physical health and fitness of the studied students depend on the content and forms of adaptive physical education of students with different medical conditions.
3. Adaptive physical education of students with disabilities is the purposeful pedagogical process, including effective means and methods adapted to their medical conditions; it contributes to increase of motor activity and leads to a positive solution of educational and health tasks by creating necessary conditions for learning motor actions and increase of motor activity during the entire period of studies at university.  
The comparative analysis of the dynamics of physical health and fitness during the many-year experiment indicates that the results were improved annually, but percentage of this improvement was different for students with different medical conditions (for both boys and girls).
4. The main directions for improvement of physical health and fitness of students with disabilities during adaptive physical education are:
  - the use of primary focus means and methods;
  - the use of a differentiated approach to physical activity;
  - the taking into account of the functional capabilities and operational state of health and interests of students with disabilities.
5. The obtained research results also testify to integration of students with disabilities into the student environment where they feel comfortable and more confident.

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## THE INFLUENCE OF ADAPTIVE PHYSICAL EDUCATION ON PHYSICAL HEALTH AND FITNESS OF STUDENTS WITH DISABILITIES

### Summary

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The article presents the results of the performed analysis of physical health and fitness of students with disabilities during their study at university if they use, in accordance with their medical conditions, the structural and functional technique of adaptive physical education proposed by the authors. The article proves that it is necessary to introduce special methods, programmes, pedagogical technologies and adaptive technical means into the educational process to ensure equal access of such people to education.

The aim of the article is to determine the impact of adaptive physical educational means and methods on physical health and fitness of students with disabilities during their study at university.

Physical health of students (boys and girls) with disabilities was assessed by employing the quick physical health assessment technique proposed by G. L. Apanasenko. This technique allows an expert to obtain information on separate indicators and their ratio. The state system of requirements for tests and assessment was used to test physical fitness of students with disabilities. The structural and functional technique of adaptive physical education proposed by the authors was used during physical education lessons.

The research involved students with disabilities (2nd and 3rd disability categories) of the Open International University of Human Development "Ukraine" (Kiev, the Ukraine) having sight or hearing impairments, musculoskeletal impairments, cerebral palsy, diabetes and somatic disorders. 644 students were examined: 337 of them were boys and 307 were girls with average age of 18 to 25 years.



The performed analysis shows positive changes in physical health and fitness of the studied students, which depend on the content and forms of their adaptive physical education. The main directions for improvement of physical health and fitness of students with disabilities during the classes of adaptive physical education are substantiated.

The obtained results prove that the variety of medical conditions, accompanying disorders, lack of motivation for motor activity require a personal approach to a person with disabilities, selection of an individual path for his/her physical development. The results testify also to students' with disabilities integration into the student environment where they feel comfortable and more confident.

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