



## Task-oriented training effect on promoting motor skills and daily physical activities in learners with musculoskeletal impairment

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### Abstract

Children frequently suffer from motor impairments which hinder their development. Every movement requires stability therefore; musculoskeletal malfunction leads to poor movement. Task-oriented training is one of many methods and techniques used to promote motor skills and daily physical activities in children. The present study's goal is to investigate how task-oriented training contributes to developing motor skills and daily physical activities in learners with cerebral palsy. The study employed a mixed- data collection strategy. The study included a total of 12 students with cerebral palsy. The promotion of a child's motor abilities and regular physical activity can be accomplished with the help of task-oriented training. The study's findings supported our hypothesis that task-oriented training that has been devised and a series of exercises to increase range of motion (flexibility) led to positive dynamics in all groups of indicators regardless of the severity of the pathology. The proposed program allowed children to increase muscle strength and range of motion in the joints. Thus, after the experimental work, the functional state of the musculoskeletal system improved and qualitative and significant changes occurred in the independence of learners. It is suggested that teachers use task-oriented training when instructing school-age children who have this disorder.

**Keywords:** Effect, Learners, Motor skills, Physical activities, Promoting, Task-Oriented training.

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### Contents

1. Introduction .....	273
2. Literature Review .....	274
3. Method .....	276
4. Results and Discussion .....	278
5. Conclusion .....	279
6. Practical Recommendations .....	280
References .....	280

### Contribution of this paper to the literature

This study analyzes whether the author's task-oriented training using a set of exercises to develop a range of motion (flexibility) that was not covered in previous studies improved musculoskeletal performance and led to positive dynamics in all group indicators of learners with cerebral palsy regardless of the severity of the pathology which contributes to a reduction in rehabilitation time.

## 1. Introduction

One of the most significant, intricate and unresolved issues of modern life is the situation of restricted abilities in children as a result of ongoing anatomical and functional changes in the body. There is a fairly large group of school-age children with disabilities and special educational needs (Chen, Fanchiang, & Howard, 2018). These children cannot learn according to the generally accepted educational programs due to the severity and complexity of developmental disorders or behavioral disorders which leads to their social maladjustment. Studies describing the development of children in this group have appeared in recent years (Bull et al., 2020; Faccioli et al., 2023; Novak et al., 2020; Pratt, 2021).

Today, children with cerebral palsy must be considered a continuous and active factor requiring systematic social decisions (Flanagan, Gaebler, Bart-Plange, & Msall, 2021; Graham, Paget, & Wimalasundera, 2019; Ostojic et al., 2023; Patel, Neelakantan, Pandher, & Merrick, 2020). It requires additional scientific justification of the most optimal methods of pedagogical influence and organizational aspects that allow for more effectively solving health-improving and formative issues.

It is important to highlight that the global incidence of congenital or acquired musculoskeletal illnesses in children is rising annually not only in Kazakhstan but also worldwide (Azzolino et al., 2021). Teachers in our country are now faced with the unfortunate reality that in working with these children, they must depend only on foreign experience even though attitudes towards them have started to alter.

A child's demand for mobility is a fundamental aspect of their development. As a result, when he starts crawling, walking, climbing and jumping, he enjoys every movement. Conversely, children who are deprived of the opportunity to move may become lethargic, apathetic and irritable. Therefore, it is impossible to ensure physical and functional development if you ignore the body's natural desire to move. The relevance of this issue is becoming increasingly important in education. Creating opportunities for physical activity for students with cerebral palsy is one of the most challenging issues since physical development strategies and approaches for children with disabilities are based on the unique characteristics of the condition and the patient's initial physical state (Boruckowski, Pujal, & Zdolińska-Malinowska, 2019; Şahin, Köse, Aran, Bahadır Ağçe, & Kayıhan, 2020). The suggested physical exercise groups for rehabilitation are mostly designed for ill children who can perform in a recumbent or sitting position. The selection process for these groups primarily disregards the participants' reserve capacity which extends the recovery process.

Significant disturbances in psychomotor, speech and motor functions as well as increased irritability, prevent these children from adapting to life in society and mastering the school curriculum. School age is a critical developmental stage that affects the effectiveness of addressing motor problems, learning new content, establishing rewards for achievement and promoting further socialization. Researchers have found that targeted training is effective for normalizing reflex motor activity and muscle tone reducing reflex excitability of the motor system and normalizing voluntary movements in the joints of the upper and lower extremities (Gomez-Cuaresma et al., 2021; Kim, Akbas, Lee, Manella, & Sulzer, 2023; Nevanperä, Hu, Walker, Avela, & Piirainen, 2023; Plaisier, Acosta, & Dewald, 2023).

Thus, the development of improved methods of rehabilitation programs using mainly active physical exercises for children will increase the efficacy of the growth of not only physical abilities but also other qualities necessary in everyday life which determines the relevance of our research. This is also the primary goal of the educational and therapeutic process for students who have been diagnosed with cerebral palsy. However, the study of this problem needs a more in-depth study based on international research and supplemented with new experimental data.

In the present study, we hypothesized that the developed task-oriented training and a set of exercises to develop a range of motion (flexibility) lead to positive dynamics in all groups of indicators of learners with cerebral palsy regardless of the severity of the pathology.

The study's goal is to investigate how task-oriented training contributes to developing motor skills and daily physical activities in learners with cerebral palsy. Several research questions have been put forth as a result:

- 1) What are the initial levels of indicators of the functional state of the musculoskeletal performance of learners?
- 2) What types of techniques are available to improve musculoskeletal performance through task-oriented training?
- 3) What are the initial levels of indicators of the functional state of the musculoskeletal performance of learners after using task-oriented training?

### 1.1. Problem Statement

Childhood disability is one of the most pressing issues in the country. Today, there are more than 94,000 children with disabilities in Kazakhstan. About 19,000 of these children are diagnosed with cerebral palsy. Cerebral palsy is a pressing problem in Kazakhstan (Kapanova, Malik, & Adylova, 2021; Nurgaliyeva et al., 2020; Zhakupova et al., 2023). There are many reasons leading to disability in children. One of them is late diagnosis and late initiation of treatment and rehabilitation. The country lacks a system of continuous, comprehensive, effective rehabilitation and early intervention.

The government of Kazakhstan has committed itself to expanding educational opportunities for children with disabilities but in practice, we have not yet seen significant changes. Today, the majority of children with disabilities in Kazakhstan do not have the opportunity to attend mainstream schools are segregated in special

schools, study at home and are isolated from the local community (Allan & Omarova, 2022; Makoelle & Burmistrova, 2021; Rollan & Somerton, 2021). The state must conduct an in-depth evaluation of the child to enable a child with a disability to attend school and receive an education on an equal footing with others. This assessment should involve the opinions of people who are familiar with the child and can advise on what kind of support is appropriate for them. Children with disabilities have historically been almost invisible in Kazakhstan and other post-Soviet countries. The negative perception remains even if the country is moving away from this approach and this is a very important problem.

There are acute and unsolvable social problems that complicate disabled children's socialization. Public transportation, residential buildings and administrative buildings are not accessible to learners with disabilities.

The program for the social adaptation of disabled learners is imperfect. It is limited only to the issuance of social benefits. There are no programs for psychological and social assistance for disabled people and their relatives and the living conditions of disabled people are not monitored.

The education of children with disabilities is at a low level and the integration of children into general education schools is insufficient. These problems have raised doubts about integrated education in special correctional educational organizations for children with disabilities. There is no critical assessment of the activities of rehabilitation institutions, equipping small centers with modern rehabilitation equipment and creating day rehabilitation centers for children with disabilities in the regions. At the same time, there are currently no generally accepted criteria for recognizing the effectiveness of rehabilitation programs based on physical activity of a sporting nature. The content of most positive reviews does not go beyond empirical observations and enthusiastic and surprising emotional reactions. The criteria for admission to classes, the assessment of health status, physical performance, adaptation to the loads of children and the very nature of their injuries which are already serious risk factors for several diseases remain not fully defined.

An analysis of the state of the problem revealed the following contradiction: there is a need to use modern health-improving and correctional techniques and a set of means for the formation and correction of the motor sphere. On the other hand, there are not enough scientifically based and tested methods aimed at developing the motor activity of children in our country. Thus, this study tries to fill this gap by identifying task-oriented training for the growth of motor skills and regular physical activity in learners with cerebral palsy at a day rehabilitation center in Almaty and then studying how this training affected their motor capabilities and the characteristics of reflex postures when taking a vertical position that contributes to a significant reduction in rehabilitation time which determines the relevance of this study.

### *1.2. Research Contribution*

The primary finding of this research is a critical assessment of the educational opportunities for children with disabilities which is a system of state-guaranteed economic, social, legal and individual-personal measures. These measures should provide objective conditions for children with cerebral palsy to overcome their disabilities so that they can participate in public life on an equal footing with healthy citizens. In Kazakhstan, social rehabilitation for children with cerebral palsy has not yet been adequately established despite the country's current legislative framework. This study will advance our understanding of the unique issues and needs faced by children with physical developmental disabilities primarily in relation to protecting their civil rights and appropriately removing material and sociopsychological barriers from their surroundings rather than from the perspective of their pathology. Furthermore, this study highlights the need to create a scientific basis to support the development of physical education for learners who have impairments, designed for motor adaptation to changing environmental conditions. It is critical to understand the importance of the author's task-oriented training in the development of motor-muscular sensations in learners with physical and intellectual developmental disabilities which underpin knowledge of the surrounding reality as well as positive emotions in the learning process. The development and implementation of targeted training will help increase their motor activity, accelerate the formation of basic motor skills and coordination abilities, increase overall physical fitness and increase the effectiveness of adaptive physical education classes in correctional institutions.

## **2. Literature Review**

### *2.1. Features of the Pathology of Cerebral Palsy*

The cause, symptoms and management of cerebral palsy have all been covered in a significant quantity of literature. It is now undeniable that cerebral palsy is a condition that develops during early life as a result of various adverse factors.

Cerebral palsy is a complex of specific motor disorders that arise as a result of damage to the child's central nervous system during intrauterine development (Sadowska, Sarecka-Hujar, & Kopyta, 2020; Wang, Munger, Chen, & Novacheck, 2018). The pathology is manifested by impaired motor functions of varying severity from mild difficulties to complete immobility. A child with cerebral palsy shows different types of mental impairment, speech problems, and mental health issues. According to global statistics, a diagnosis of cerebral palsy is made on average in 2–7 children out of every thousand (McIntyre et al., 2022). Cerebral palsy is a group of conditions (rather than one specific disease) in which there is non-progressive spasticity, ataxia or involuntary movement (Darbinian et al., 2023; Darling-White & Jaeger, 2023).

A modification in the biodynamics of muscles is the primary characteristic of cerebral palsy which explains the disease's communication.

Healthy children and adults have the ability to passively stretch their muscles which is necessary for joint motions as well as contract and relax in response to external stimuli or a voluntary order from the brain's central control systems. The entire structure of movements requires the participation of a large number of muscles, each of which must contract with a strictly defined force and for a strictly defined time. The entire motor development process is disrupted in learners, impairing the formation of neuropsychiatric functions because movement is one of the main manifestations of the body's vital activity and all its most important functions such as breathing, blood

circulation, swallowing, urination, moving the body in space and speech are realized through muscle contraction (movement).

## *2.2. The Importance of Educating Children with Disabilities*

Currently, it must be stated that the state of Kazakh research in this area remains insufficient. Unfortunately, the holistic concept of building an inclusive educational space that ensures real access for people with disabilities to the educational resources of society and their full socio-cultural integration taking into account special needs and opportunities has not been developed in domestic science (Human Rights Watch, 2018; Kazakhstan: Education Barriers for Children with Disabilities, 2019). Available research and experimental design of individual parameters of inclusive education eclectically presents a solution to this problem (An, Chan, & Kaukenova, 2020; Maulsharif, Nurbekova, & Naimanova, 2022). It is known that the development of guidelines and recommendations for practical implementation is possible only with an appropriate theoretical and experimental level of development of the science itself.

In the modern study, we find differing views of researchers on using new terminology and on rethinking and understanding the nature of impaired development. A departure from established terminology leads to a blurred understanding of the essence of impaired development. "Children with impairments" has been used recently. It precisely defines the identified group of children. Inaccuracy, superficiality and inconsistency of terms and concepts are significant problems in the implementation of a comprehensive psychological, medical and pedagogical examination of children and adolescents for learning (Soldevila-Pérez, Calderón-Almendros, & Echeita, 2022).

It's important to see the positive aspects of the developing discussion and search for new interpretations of what was before referred to as disrupted or abnormal development. The discussion about the use of terms is also relevant in connection with the practical need to determine the parameters of special educational needs that require satisfaction in the learning process when building an educational space for various categories of children. The development of the practice of inclusion has updated the understanding of the essence of a person with psychophysiological disorders as well as issues of value attitude towards manifestations of "non-typicality." Educational inclusion is seen as a tool to overcome the shortcomings of residential institutions and at the same time, a strategy designed to combine the achievements of special and general education systems, making the boundaries between them permeable. However, the positions of modern authors on the introduction of inclusive education are very contradictory (Dignath, Rimm-Kaufman, van Ewijk, & Kunter, 2022; Leijen, Arcidiacono, & Baucal, 2021). On the one hand, it is argued that today the educational system is not ready for inclusion. On the other hand, it has been mentioned that the joint education of children in our country is by no means an innovation; cases of inclusion of special children have always occurred in the practice of mass education. In addition, the list of risks of joint education is presented in such a way that its implementation is almost impossible. On the other hand, it is demonstrated that there is no alternative to inclusive education. For some representatives of the teaching community, inclusion causes fear, rejection and mistrust. Others have hopes for renewal towards the humanization of education, searching for ways to build a socially in-demand educational model for the majority of people with special needs.

Works that analyse teachers' preparedness to conduct inclusive education from the perspective of a thorough and methodical assessment of different preparation components are very important. Alzahrani (2020) and Spandagou (2021) make a valuable contribution to determining the essence of the problems and obstacles in realizing the right of people with disabilities to a full-fledged education. Their research contributes to an understanding of the difficulties in organizing inclusive education and is important for understanding and justifying the need for simultaneous structural changes in all segments of social reality.

The researchers emphasize that inclusion in civil society, respect for human rights and collaboration must begin with education. The prevalent conceptual models in society are thoroughly examined and social policies and programmes for individuals with disabilities are formed based on the results (Hogan, 2019). The development of the so-called philosophy of independent living which requires one to perform social roles and make decisions that lead to self-determination, the ability to fully control one's life based on acceptable choices that reduce dependence on others in decision-making and daily activities reflected changes in public perception of the nature of disability.

Thus, inclusive processes in education pose new challenges and research for science which are:

(1) Studying the process of personality formation and the cognitive and emotional development of students in inclusive educational institutions would provide a scientific basis for its effectiveness or vice versa. It is necessary to characterize and analyze how the processes of socialization, identification and individualization occur, what mechanisms are used by children and what the dynamics of intragroup processes are.

(2) The search for mechanisms and strategies for overcoming difficulties and barriers in the social environment and identifying conditions that would allow answering questions about the content of the development of life competence in children with developmental disorders.

The search for new diagnostic tools that make it possible not only to record the current level of development of the personality and psyche of a special child but also his potential abilities that need to be actualized through the creation of appropriate conditions in the socio-educational environment. Thus, we can try to answer the question about the prospects for the child's development.

(3) Nowadays, the most common issues we address are the effects of physical and mental disabilities and what an individual is unable to accomplish because of a limiting defect. However, we also need to address problems that are fundamentally different: what a person with disabilities can do and how the quality of development a child with a disability can achieve (how socially successful he can become) if the necessary conditions for socialization and learning are created.

(4) Scientific research and development of educational technologies that meet the needs of modern practice and rationally influence the elimination of existing shortcomings. This practice will be widely adopted in educational organizations at all levels as legal and regulatory support for inclusion grows. As a result, collaboration between researchers and practitioners in the design of acceptable educational technologies that can be offered to educational organizations is important.

### 2.3. Adaptive Physical Education

Physical activity among students in auxiliary schools helps to improve their physical and psychological conditions, correct motor disorders and socialize their personalities. Adaptive physical education is a component (type) of adaptive physical education that satisfies the needs of an individual with health problems in preparing him for life, everyday life and work and in the formation of a positive and active attitude towards APC. Physical education is the most important part of the overall system of education, training and treatment (Foster, Scott, Tiderius, & Dobbs, 2020; Yamato et al., 2020). The basis of the physical education of these children is ontogenetically consistent stimulation of motor development taking into account the qualitatively specific disorders characteristic of different clinical forms of the disease (Abusleme-Allimant et al., 2023; Lorás, 2020; Marinšek & Lukman, 2020). General movement development must be carried out progressively throughout specific activities in order to account for the degree of production of fundamental motor functions. It is required to address the following problems during the remedial work:

1. The formation of control over the position of the head and its movements.
2. Training in extension of the upper body.
3. Training the support function of the hands (support on the forearms and hands).
4. Formation of the function of sitting and sitting down independently.
5. Learning to get on all fours, developing balance and crawling in this position.
6. Learn to kneel and then stand.
7. Development of the ability to maintain an upright posture and walk with support.
8. Stimulation of independent walking and correction of its disorders.

Physical therapy (PT) and massage are important for cerebral palsy in children when pathological changes in muscle tone are observed due to which many static and locomotor functions cannot develop spontaneously or incorrectly (Lee et al., 2019). An individual complex of physical therapy and massage is selected for each child depending on the form of the disease and age. The main objectives of therapeutic gymnastics are inhibition of pathological tonic reflex activity, normalization based on muscle tone and facilitation of voluntary movements and training for the consistent development of age-related motor skills in the child. At the beginning of the development of general motor skills, all activities are aimed at nurturing delayed stato-kinetic reflexes, eliminating the influence of tonic reflexes and then developing the capabilities of active movements. Activities aimed at developing general motor skills should be preceded by techniques aimed at normalizing muscle tone. Cerebral palsy patients often benefit from general therapeutic and acupressure massage in addition to physical treatment. Classic therapeutic massage helps relax spastic muscles and strengthens and stimulates the functioning of weakened muscles (Mahmood, Habibullah, & Babur, 2019).

It is necessary to include one of the most powerful compensation mechanisms in correctional work: motivation for activity, interest and personal activity of the child in mastering motor skills. It is important to make sure that the children comprehend the actions. He explains the logic behind each action's progress while fostering different parts of motivation.

Exercise therapy programmes focus on developing motor skills that are essential for daily life, including those that enable ambulation, practical tasks, and self-care for children. It is advisable to constantly adapt the trained skills and abilities to the child's everyday life. Most exercises are best delivered in the form of games that are enjoyable for the child encouraging him to perform the desired active movements subconsciously.

## 3. Method

### 3.1. Research Method

The study employed a mixed-data collection strategy (Campbell, Goodman-Williams, Feeney, & Fehler-Cabral, 2020; Dawadi, Shrestha, & Giri, 2021; Noyes et al., 2019; Wilkinson & Staley, 2019). The principle that multiple measurements need to be used to improve data reliability has become one of the fundamental elements of triangulation procedures (Bastidas, Medina, Báez, Antoima, & Bastidas, 2018). Combining multiple methods allows researchers to triangulate findings and test results against different data sources which increases the overall reliability of the study (Jafer et al., 2021). Qualitative and quantitative methods provide different types of information and their integration can provide a more complete understanding of complex phenomena (Taherdoost, 2022). Qualitative methods allow for in-depth exploration of context and individual experiences which enriches the interpretation of quantitative results (Busetto, Wick, & Gumbinger, 2020; Tanner et al., 2021). Thus, mixed methods research allows researchers to change their approach throughout the study allowing them to discover unexpected results or answer new questions (Timans, Wouters, & Heilbron, 2019).

### 3.2. Research Sample Formation

The study was conducted based on the "Rakhym" Health Support Center for Children and Adolescents with Disabilities, Kaskelen, Kazakhstan from October 2022 to March 2023. The 12 participants (seven boys and five girls; age =  $7.5 \pm 0.2$  years) volunteered to take part in the study and were assigned at random to one of the following groups: The control group used therapeutic exercise training and the experimental group used the author's task-oriented training. An independent research assistant assigned the children to these groups at random.

### 3.3. Design

Participants in the control group participated in a 20 minute therapeutic exercise session. The identical programme and task-oriented training were both presented to research group participants for twenty minutes each. The class included the preparatory, main and final parts. During the classes, visual and verbal methods were used as well as the game method and methods of teaching motor actions.

The main objectives of task-oriented training are the normalization of reflex motor activity and muscle tone, reduction of reflex excitability of the motor system, normalization of muscle feeling, combating vicious motor stereotypes, stimulation of some stat kinetic reflexes and normalization of voluntary movements in the joints of the upper and lower extremities. Training took place three times a week. All exercises are performed 10–12 times

in one session at a calm and slow pace. All types of exercise were adapted to the study participants. Relieving tension is the first step in working with children who have cerebral palsy since it forms the basis of the fundamentals. Participation in the exercises was performed with a high level of safety for learners and no adverse events or risk of injury in them were recorded. The foundation of classes is the concept of systematicity which develops from simple to complex in order to ensure perfect performance in motor activities. A technique to maintain the physical performance and activity of children in the classroom is the alternation of developmental and educational exercises with children's "favorite" motor tasks (see Table 1).

**Table 1. Task-oriented training program.**

No	Activity\Training	Description
1	Walking speed	The steps are in one place in a minute.
2	Squats (Half squats)	The account squats in a minute.
3	Step length measurements	Were recorded with a centimeter tape and were recorded on the table.
4	Strength and endurance of the abdominal muscles.	Starting position: lying on your back and arms along the body. Raise straight legs at an angle of 45 degrees holding weight.
5	Strength and endurance of the back muscles.	Starting position: lying on a bench, torso lowered, holding the weight of the torso horizontal to the floor, arms up (or behind the back).

The research indicates that different types of techniques are available to improve musculoskeletal performance. For example, (1) [Das and Ganesh \(2019\)](#) suppose that physiotherapy improve patients' quality of life. Its goals include improving muscle growth, improving motor function and improving movement coordination. (2) [Sutapa, Pratama, Rosly, Ali, and Karakauki \(2021\)](#) consider that preschoolers' play activity contributes to physical development, motor skill improvement, increased attention, speech development and the creation of a favorable emotional environment to increase the functionality of physiological systems. (3) [Esmailiyan, Marandi, Darvishi, Haghjooy Javanmard, and Amerizadeh \(2023\)](#) believed that during swimming, the musculoskeletal reaction of the child's arms and legs, their rhythm and consistency are more effectively formed, the balance reaction and coordination of movements are improved and motor activity increases.

### 3.4. Measurement Procedures

There were several stages to task-oriented training for learners with cerebral palsy:

- (1) The first stage includes the restoration of voluntary joint movements.
- (2) The functions of weakened muscles were stimulated in the second stage.
- (3) The third stage includes the formation and development of motor skills.
- (4) The development of coordination ability is the fourth stage.
- (5) Motor activities are developed in the fifth stage.
- (6) The sixth stage includes the playful development of physical qualities.

### 3.5. Measurement Tools

Measuring is carried out using a set of motor tests allowing for the determination of the state of the musculoskeletal apparatus and muscular system in children.

- 1) Assessment of the formation of the control overhead position, the development of support reactions and arm balance.
- (2) Assessment of the development and formation of fine motor skills and hand movements.
- (3) Assessment of the formation of the torso and sitting control.
- (4) Assessment of the development of verticalization and movement.
- (5) Assessment of abdominal muscle strength and endurance (second).
- (6) Assessment of strength and endurance of back muscles (second).
- (7) Estimated number of squats (per minute).
- (8) Step length estimate (cm).

Different starting positions make the procedure more comfortable for both the teacher and the learners. Exercise completion was graded with a maximum of 10 points.

A level of physical ability is determined by converting the assessment result which is a sum of points using a formula. The formula for the conversion is as follows:

$$F = \frac{\sum \text{scores}}{\sum \text{norm scores}} \times 100\%, \text{ where } F \text{ is the level of motor skill}$$

Motor skill levels:

- From 0 to 20% (low).
- From 21 to 40% below average.
- From 41 to 60% (average).
- From 61 to 80% (above average).
- From 81 to 100% high.

### 3.6. Data Analysis

The results were compared based on the student's-t-test. It was decided to use 0.01 as the maximum permissible level with a 5% significance level of 0.05. As a maximum permissible level, there was a 5% significance level of 0.05, and 0.01 was chosen as is customary in research. Both the mean and the standard deviation were determined to calculate the t-test. If the value of  $t < 0.05$ , the hypothesis of significant differences is accepted, i.e., a conclusion is made about the effectiveness of the experimental intervention.

### 4. Results and Discussion

Table 2 shows a comparative analysis of the dynamics of the motor stereotype before and after the study.

Table 2. Indicators of the dynamics of the motor stereotype before and after the study.

Indicators	Research stages	M ± m	P t-test	
The formation of the control above position. The development of support reactions and the arm balance.	Before	40.2 ± 22.4	0.04	
	After	58.3 ± 24.2		
The formation of fine motor skills and hand movements.	Before	50.4 ± 18.06	0.03	
	After	66.5 ± 21.03		
The formation of the torso and sitting control.	Before	50.4 ± 20.04	0.05	
	After	63.5 ± 20.18		
The development of verticalization and movement.	Before	42.5 ± 17.5	0.04	
	After	56.4 ± 21.4		
Abdominal muscle strength and endurance (Second).	Before	3.8 ± 1.4	0.001	
	After	8.3 ± 2.04		
The strength and endurance of back muscles (Second).	Before	5.6 ± 3.2	0.04	
	After	10.2 ± 5.3		
Walking speed (Number of steps per minute).	Before	14 ± 7.4	0.05	
	After	24.6 ± 12.1		
The number of squats (Per minute).	Before	14.07 ± 6.4	0.003	
	After	26.6 ± 10.12		
The step length leg (cm)	Right leg	Before	4.7 ± 2.2	0.0001
		After	11.2 ± 3.01	
	Left leg	Before	5.2 ± 1.7	0.0001
		After	11.7 ± 2.05	

The dynamics of correction of the functional state of the musculoskeletal system according to individual testing indicators are presented in Figures 1 and 2.

The initial indicators of the formation of control over the position of the head, the development of support reactions and the balance of the arms averaged  $x = 40.2$ ; the final values were  $x = 58.3$ . The significance level according to the student's t-test was obtained with a value equal to 0.04, i.e.  $p < 0.05$  which indicates the reliability of the results obtained.

Indications for the formation of fine motor skills and movements of the upper limbs at the ascertaining stage averaged  $x = 50.4$ ; final indicators  $x = 66.5$ .

The significance of the value  $p = 0.03 < 0.05$  is dynamics after physical education and recreation activities.

The formation of control of the torso and sitting indicators before the experiment was  $x = 50.4$ ; the final value  $x = 63.5$  and the t-test value is 0.05.

Stable dynamics are noted in the group of walking skills and verticalization development despite the dominance of damage to the lower extremities. Initial indicators  $x = 42.5$ ; final  $x = 56.4$ ; p-value = 0.04 which indicates a tendency in motor skills in a standing position.

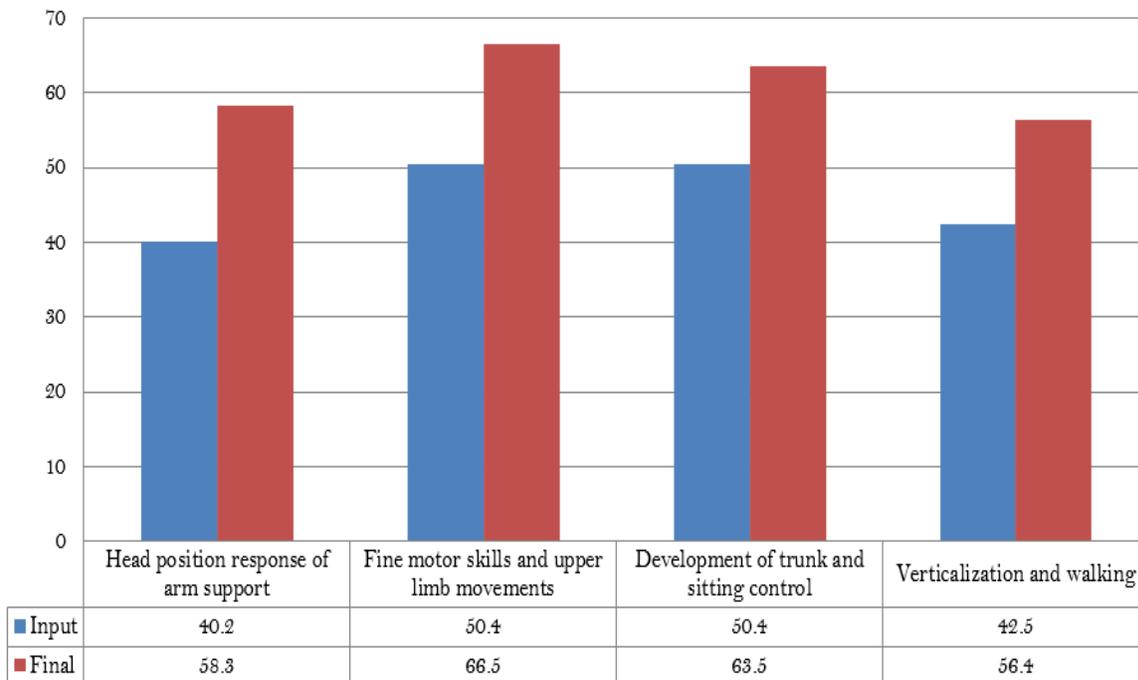


Figure 1. Indicators of motor development.

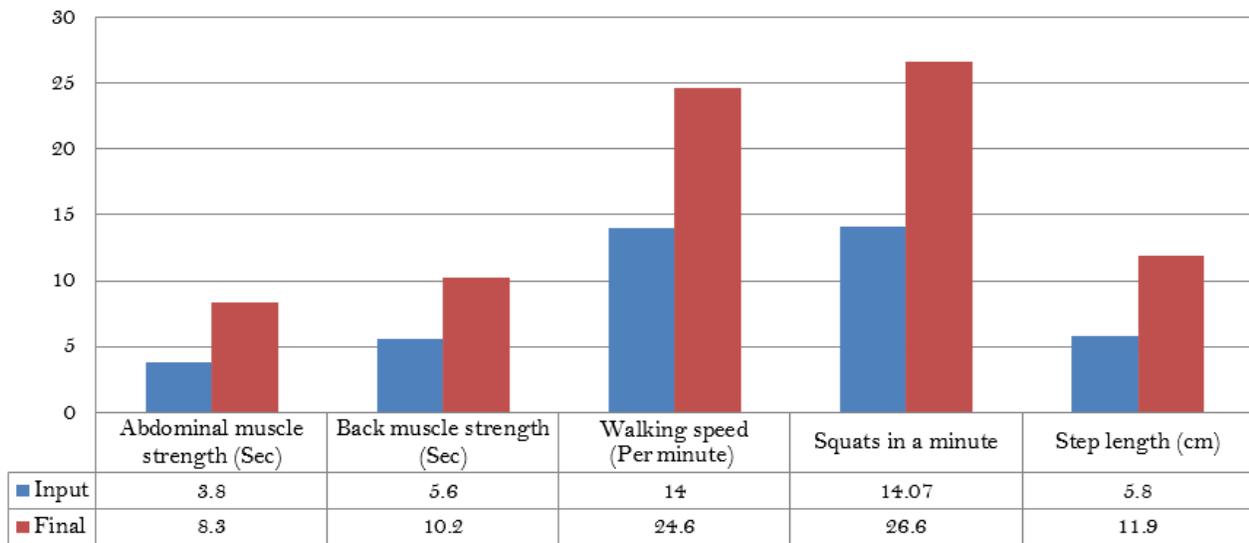


Figure 2. Indicators of motor development.

Initial indicators of strength and endurance of abdominal muscles are as follows:  $x = 3.8$  and final  $x = 8.3$ . The obtained results have a significance level of  $t$  less than 0.05 (0.001) which is an indicator of the effectiveness of the training used.

Initial indicators of strength and endurance of the back muscles ( $x = 5.6$ ,  $x = 10.2$ ,  $p = 0.04$ ) indicate the presence of a positive result after the applied methods of rehabilitation work. A graph was drawn by counting the beginning and ending numbers,  $x = 14$   $x = 24.6$  in order to determine the dynamics of walking speed. Initial indicators indicate a low level of walking speed after the training.

After rehabilitation, the values increased which gives grounds to believe that performance is equal to average. In addition, the  $p$ -value is 0.05 which indicates the reliability of the results obtained.

Measuring the step length also showed the effectiveness of the program. The initial step length measurements were  $x$  ( $pr/l$ ) =  $5,8 \pm 1,7$ . After rehabilitation, the values were  $x = 11,9 \pm 2,05$ . The significance level showed  $p = 0.0001$  which is a positive indicator of restoration measures.

Test results for the number of squats increased by 13%. Specific figures for initial indicators are  $x = 14.07$  and final data is  $x = 26.6$ . At  $p = 0.003$ , i.e.,  $0.003 < 0.05$ . The developed task-oriented training is effective.

Thus, all participants in the experimental group expanded their range of motor abilities developed certain motor skills and coordination of movements and improved support abilities that were previously absent. Before training, the majority of the children examined had a pronounced dissociation between muscle tone and strength. It is in the muscles that cause the identified symptom complexes that a combination of severe muscle hypertension and mild paresis was noted. We considered these changes a manifestation of inadequate muscle-tonic reactions aimed at forming an optimal motor stereotype and maintaining a vertical posture. The majority of children in the main group showed improvements in their motor patterns and vertical posture.

In these children, the synchronization of the movements of the shoulder and pelvic girdles was partially restored, the stiffness and awkwardness of arm movements decreased and the restrictions on the movements of the cervical spine in a vertical position almost completely disappeared.

Children whose primary symptoms were stabilized lower back hyper lordosis and knee joint recurvation were less influenced by improvement. A decrease in the rigidity of the muscles of the lower back and hips in such children violates the established motor stereotype and the originality of the posture since it reduces the resistance of these muscles to the forces of gravity. There were minor changes in the severity of the symptoms studied in children in the control group throughout the observation period. These results are consistent with those of other researcher including Church et al. (2022); Shahid, Kashif, and Shahid (2023); Edwards et al. (2021) and Narayan et al. (2023). Training resulted in significant changes in spasticity and muscle strength in both groups. As a result, comprehensive rehabilitation has demonstrated efficacy in restoring physiological muscle tone and activating antagonist's muscles inclusion of methods for developing hand motor skills in the rehabilitation program enabled statistically significant dynamics (Brinlee, Dickenson, Hunter-Giordano, & Snyder-Mackler, 2022; Fattorini, Rodio, Filippi, & Pettorossi, 2023; Velnar, Spazzapan, Rodi, Kos, & Bosnjak, 2019). Many cerebral palsy children have disrupted movement rhythms and are unable to coordinate their movements to a given rhythm. As a result, we practiced exercises in place and motion, counting and clapping in a specific rhythm (Sansare, Behboodi, Johnston, Bodt, & Lee, 2021; Schweizer, Eylon, & Katz-Leurer, 2020). The amplitude and tempo of movements, the uniformity of step length and the coordination of voluntary movements, the activity of attention and the emotional tone of the children were all regulated using musical rhythms.

The evaluation of test results to determine motor skills at the beginning and end of the experiment revealed statistically significant differences. All learners in the experimental group expanded their range of motor abilities, developed certain motor skills and coordination movements and improved their ability to support which were previously absent. This demonstrates that the task-oriented training developed significantly improves the motor abilities of learners in correctional institutions.

## 5. Conclusion

The majority of disabled children in Kazakhstan attend special schools that are closed to the general public, learn at home or are otherwise isolated from their communities making this study relevant. There are acute and unsolvable social problems that complicate disabled children's socialization, preventing these children from adapting to life in society and mastering the school curriculum. This study tries to fill this gap by developing task-oriented training for the growth of motor skills and regular physical activity in learners which contributes to a reduction in rehabilitation time. The development of means and methods for correcting motor activity is based on

the specifics of the disease and the initial state of the body. The main objectives of the restorative process of rehabilitation are inhibition of pathological tonic reflex activity, normalization of muscle tone on this basis, facilitation of voluntary movements and training for the consistent development of age-related motor skills in children. An essential consideration in selecting an exercise programme was the muscle's need to be able to rapidly transition between different states of contraction, relaxation and extension during any given activity. Such activity is the initial condition for the normal functioning of the muscles of children, including coordinating their interaction with other muscles. Developing the flexibility of different parts and the entire body of children in appropriate directions, the classes alternated tension and relaxation in the muscles, changing the direction of the load. It is evident from the statistical analysis of the research materials that the set of physical exercises enables you to consistently practice balanced strength and coordination actions. Including improving support ability, normalizing the position of the center of gravity and actively forming an optimal motor stereotype in students which is important in the rehabilitation of learners. The study's results thus confirmed our hypothesis that task-oriented training and a set of exercises to develop a range of motion (flexibility) lead to positive dynamics in all groups of indicators regardless of the severity of the pathology. The proposed program allowed children to increase muscle strength as well as range of motion in the joints. Thus, after the experimental work, the functional state of the musculoskeletal system improved. Therefore, self-care skills and qualitative and significant changes occurred in the independence of learners.

## 6. Practical Recommendations

Further development of the social institution of adapted physical culture is necessary to increase the social chances that Kazakhstan's rehabilitation system offers to those with disabilities. When planning and carrying out rehabilitation measures for children suffering from congenital or acquired diseases at the stages of transition from physical therapy to adaptive physical activity, it is necessary to strengthen coordination and expand interaction between interested medical, physical education and sports services.

Priority measures to ensure a favorable environment for children with disabilities include the installation of means to facilitate access to physical education, sports and rehabilitation facilities.

Comprehensive rehabilitation measures for children in this category are required. During lessons, a number of elements that impact the workload must be taken into account while upholding the gradualness and systematicity principles.

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