

Modern pedagogical technologies of physical rehabilitation of children with musculoskeletal disorders Tecnologías pedagógicas modernas de rehabilitación física de niños con trastornos musculoesqueléticos

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Abstract. The main factor of disability in the world are diseases, as well as disorders of the musculoskeletal system. Thus, the study of modern pedagogical technologies of physical rehabilitation of children with musculoskeletal disorders is an important and urgent problem for modern research activities in the field of pedagogy. The purpose is to analyse and study modern pedagogical technologies of physical rehabilitation of children with musculoskeletal disorders. The methodological basis of the research is based on a combination of various general methods of scientific cognition. The methods of information analysis and synthesis, the comparative method, as well as the method of induction and deduction, were used in this study. At the final stage of the study, the method of analysing scientific literature relevant to the subject was used. Musculoskeletal disorders are noted in 5-7% of children and may be congenital or acquired. Anomalies of development in children with motor pathology are characterised by impressive polymorphism and dissociation according to the severity of various disorders. Comprehensive support for children with musculoskeletal disorders is interdisciplinary in nature since it is at the intersection of medicine, pedagogy and special, pedagogical, and social psychology. For the development and establishment of a disabled child, the involvement of specialists is necessary: a neurologist, a speech therapist, a special psychologist, a teacher, an educator. The practical value of the study consists in the fact that it can be used as a basis for subsequent research, as well as for a comprehensive study of the presented problem.

Keywords: remedial work; programme of remedial work; development; correction; exercises; junior schoolchildren; children with musculoskeletal disorders.

Resumen. El principal factor de discapacidad en el mundo son las enfermedades, así como los trastornos del sistema musculoesquelético. Por tanto, el estudio de las tecnologías pedagógicas modernas de rehabilitación física de niños con trastornos musculoesqueléticos es un problema importante y urgente para las actividades de investigación modernas en el campo de la pedagogía. El objetivo es analizar y estudiar tecnologías pedagógicas modernas de rehabilitación física de niños con trastornos musculoesqueléticos. La base metodológica de la investigación se basa en una combinación de varios métodos generales de cognición científica. En este estudio se utilizaron los métodos de análisis y síntesis de información, el método comparativo, así como el método de inducción y deducción. En la etapa final del estudio se utilizó el método de análisis de la literatura científica relevante al tema. Los trastornos musculoesqueléticos se observan en el 5-7% de los niños y pueden ser congénitos o adquiridos. Las anomalías del desarrollo en niños con patología motora se caracterizan por un polimorfismo y una disociación impresionantes según la gravedad de los distintos trastornos. El apoyo integral a los niños con trastornos musculoesqueléticos tiene un carácter interdisciplinario ya que se encuentra en la intersección de la medicina, la pedagogía y la psicología especial, pedagógica y social. Para el desarrollo y establecimiento de un niño discapacitado es necesaria la participación de especialistas: un neurólogo, un logopeda, un psicólogo especial, un maestro, un educador. El valor práctico del estudio consiste en que puede utilizarse como base para investigaciones posteriores, así como para un estudio integral del problema presentado.

Palabras clave: trabajos de recuperación; programa de trabajos de recuperación; desarrollo; corrección; ejercicios; niños de primaria; niños con trastornos musculoesqueléticos.

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Introduction

As of 2021, about 1.71 billion people in the world suffer from musculoskeletal disorders. Disorders and diseases of the musculoskeletal system considerably limit mobility, which leads to premature termination of work, a decrease in well-being, and a reduction in opportunities for involvement in public life. Due to the growing population and its ageing, the number of people with musculoskeletal disorders is rapidly increasing (Mokiya-Serbina & Busoverya, 2016).

Disorders and diseases of the musculoskeletal system include more than 150 disorders of the musculoskeletal system. Their range is wide: from acute and short-term events, such as fractures, sprains, and dislocations, to life-long disorders accompanied by irreversible functional disorders and disability. Disorders and diseases of the musculoskeletal system are usually characterised by pain (often

constant), limited mobility, motor disorders, and general disorders of functional abilities that limit a person's ability to work (Vorobyova, 2020). Disorders and diseases of the musculoskeletal system include disorders that affect: joints, especially osteoarthritis, rheumatoid arthritis, psoriatic arthritis, gout, ankylosing spondylitis; bone tissue, especially osteoporosis, osteopenia, and related fractures caused by fragility or injury of bones; muscles, especially sarcopenia; spine, especially lumbago and cervicgia; various parts of the body or body systems, in particular regional and general pain syndromes and inflammatory diseases, such as connective tissue diseases and vasculitis, characterised by musculoskeletal symptoms or systemic lupus erythematosus (Rudneva, 2015; Oshurko & Oliinyk, 2019).

In addition, musculoskeletal disorders and diseases are the most important factors in the global need for rehabilitation services. They are one of the main reasons for the demand for such services for children, and about two-thirds

of the adult population in need of rehabilitation services are people with musculoskeletal disorders (Sollerhed et al., 2020; Sharmanov et al., 2016). According to research, 1.71 billion people worldwide have problems with the musculoskeletal system. Although the prevalence of musculoskeletal disorders depends on age and diagnosis, they affect people of all ages around the world. High-income countries (441 million people) suffer the most from these diseases, followed by countries in the Western Pacific (427 million people) and Southeast Asia (369 million people). Disorders and diseases of the musculoskeletal system are also among the main factors of disability in the world (Roetert et al., 2017; Jaskiewicz et al., 2015). Although the incidence of musculoskeletal diseases increases with age, they also affect younger people, often during the years of greatest economic activity. The main reason for early termination of employment may be conditioned upon, for example, lumbar. The negative social consequences are really huge, not only in terms of direct health care costs but also in terms of indirect costs (for example, absence, reduced productivity) (Moskvina, 2022). In addition, musculoskeletal disorders and diseases are closely associated with a marked deterioration in mental health and functional disorders. The number of people with a waist belt is expected to grow in the future, with the fastest growth in low- and middle-income countries (Corbin, 2016).

Today, the provision of prevention, treatment, psychological, teaching, and social assistance to children with musculoskeletal disorders is becoming more effective. The main importance of the educational system for children with disabilities is contained in their social adaptation and integration into society. Anomalies of development of the musculoskeletal pathology in children are characterised by formulated polymorphism and inconsistency of the severity of various disorders. The leader of the medical picture is represented by a motor error (delayed development, underdevelopment, regression or loss of motor functions). Currently, preschoolers with limited motor skills are extensively integrated into general preschool institutions. Children with mild motor pathology do not feel difficulties in a group of healthy peers, successfully assimilate the public kindergarten programme. Children with motor disorders of a neurological nature often feel obstacles in adapting to the conditions of a public educational institution because motor disorders are often combined with a lack of speech and cognitive development in these children. When making a decision on enrolling a child with motor pathology in a general education institution, it is necessary to accurately check the likely risks (Stephensen et al., 2018). The purpose of the study is to analyse and study modern pedagogical technologies of physical rehabilitation of children with musculoskeletal disorders.

Materials and Methods

The methodological basis of the research is based on a

combination of various general methods of scientific cognition. The methods of information analysis and synthesis, the comparative method, as well as the method of induction and deduction, were used in this study. At the final stage of the study, the method of analysing scientific literature relevant to the subject was used.

The method of information synthesis, analysis, and comparison

Synthesis is the process of joining or combining previously disparate things or concepts into one whole or set. Synthesis is also a method of combining the whole from functional parts, unlike the analytical method, this method involves dividing the whole into functional parts. This method can help collect data on the effectiveness of various pedagogical approaches, the challenges faced, and the preferences of those directly involved in the rehabilitation process.

The study also used the method of information analysis. Analysis is the process of dividing a complex subject or object into smaller parts to gain a broader understanding of the presented subject or object. By closely examining individual cases, researchers can gain a deeper understanding of the specific challenges, progress, and outcomes associated with different rehabilitation methods.

Comparison can be characterised as a logical technique necessary in any cognitive activity: at different stages and at different levels, regardless of the subject. Comparison can be used as a special research method only if the comparison procedure requires special training and special organisation. Such a need usually arises when comparing complex objects and phenomena that are characterised by a large set of very different characteristics. The experience of comparative law shows that based on the comparative method, it is possible to solve not only scientific and educational but also important applied tasks. The comparative method was used at the final stage of the research to study and summarise the results (Montoya, 2023).

In conclusion, this study employed various methods, including synthesis, analysis, and comparison, to comprehensively investigate and understand the subject at hand. Synthesis allowed for the integration of disparate concepts into a cohesive whole, while analysis facilitated the dissection of complex elements to gain a deeper insight. Comparison served as a valuable tool, particularly when dealing with intricate objects and phenomena with diverse characteristics, and it played a crucial role in both the research process and the practical applications of the findings. Ultimately, the utilization of these methods contributed to a thorough examination of the subject, leading to valuable insights and a more comprehensive understanding of the research objectives.

The methods of induction and deduction

The inductive method is a method of research and presentation in which there is a transition from the observed

concrete facts to the allocation of principles, general provisions of the theory, and the definition of patterns. The deduction is a method of thinking, the result of which is a logical conclusion, the validity of which is guaranteed by the truth of the assumption. This approach can reveal the sustainability of rehabilitation outcomes and the impact of pedagogical technologies on the long-term development and well-being of these children. This approach can provide a more holistic understanding of the subject, capturing both quantitative measurements of rehabilitation outcomes and qualitative insights from participants (Ortiz Gómez et al., 2023).

This study employed both inductive and deductive methods to advance our understanding of the subject matter. The inductive approach allowed for the systematic transition from concrete observed facts to the identification of underlying principles and theoretical generalizations, enabling the recognition of patterns and trends. Meanwhile, deductive reasoning was utilized to derive logical conclusions based on sound assumptions, ensuring the validity of the outcomes. Additionally, a rigorous analysis of scientific literature was conducted, representing a demanding yet indispensable research method. This involved the acquisition of valuable data, the organization of material in accordance with the research plan, and the exploration of various works by researchers, all contributing to the formulation of a well-informed working hypothesis and a comprehensive examination of the subject.

The analysis of literary sources

At the final stage, an analysis of the scientific literature was carried out. The analysis of scientific literature is an accessible research method but also the most demanding one. This method requires certain skills of working with literature: the ability to take notes, group material in accordance with the work plan (Paez et al., 2023). The main purpose of analysing literary sources is to collect scientific data on the subject under study, consider the prospects of research, and formulate a working hypothesis. When analysing literary sources, various works of researchers were considered. The analysis of literary sources emerged as a pivotal and primary research method in this study, facilitating a thorough qualitative examination of the subject matter and enabling a comprehensive analysis of the work conducted by other esteemed researchers. The insights gathered from the works of scholars such as N.P. Prokopenko, N.A. Gross, S.Yu. Maksimova, O.A. Shestakova, A.A. Naumov, N.P. Bolotova, N.G. Merkulova, N.N. Romanova, and numerous others who have delved into the same subject, played a fundamental role in formulating valuable conclusions and providing the necessary foundation for future research endeavors. This method not only contributed to the depth of understanding of the issue under investigation but also underscored the importance of collaborative knowledge-building in academic discourse. Analyse scientific articles, books, and academic papers to understand the historical de-

velopment, current trends, and best practices in pedagogical technologies for the physical rehabilitation of children with musculoskeletal disorders. This step provides valuable insights into the existing research landscape.

Results and Discussion

Continuous comprehensive support for children with disabilities is considered a process aimed at creating the most favourable conditions for their integration into society of peers with standard development. The analysis of practice shows that it is a continuous integrated approach to working with a special child, from early help to his employment, that allows creating optimal complex conditions that ensure the harmonious establishment and development of personality. A complex is understood as a set of parts, interconnected blocks that ensure their high-quality work. Among children with developmental disorders, children with musculoskeletal disorders are most often found. Comprehensive support for children with musculoskeletal disorders is interdisciplinary in nature since it is at the intersection of medicine, pedagogy and special, pedagogical, and social psychology. This suggests that for the development and establishment of a disabled child, the involvement of specialists is necessary: a neurologist, a speech therapist, a special psychologist, a teacher, an educator. A considerable percentage of children with musculoskeletal disorders are children with cerebral palsy (Kavylina & Podhorna, 2021). This disease often causes disability (Table 1).

Table 1.
Musculoskeletal Disorders.

Disorder Category	Specific Disorder or Location
Osteoarthritis	Hip
	Knee
	Wrist and hand
Other arthropathies	Rheumatoid arthritis
	Psoriatic arthritis
Disorders of the back	Chronic low back pain

Musculoskeletal disorders are noted in 5-7% of children and may be congenital or acquired. Anomalies of development in children with motor pathology are characterised by impressive polymorphism and dissociation according to the severity of various disorders. The category of children with disorders of the musculoskeletal system is clinically, psychologically, and pedagogically very heterogeneous. In all children, motor disorders (delayed onset, underdevelopment, or loss of motor function) lead to a medical situation that can be of various severity levels: with a severe degree of motor damage, the child cannot walk; with an average (moderate) degree of motor disorders, children can walk but unstably, often using specific equipment, which means that independent movement of children is difficult. Their self-care abilities are not formed absolutely due to a violation of the function of the hands; with a slight degree of motor disorders, children walk independently, confidently. They fully serve themselves; manipulative activity is quite

formed. However, they may have unnatural painful positions, gait disorders; movements are not agile enough, slow. Reduction of muscular strength, violations of fine motor skills. All preschoolers with musculoskeletal disorders can be symbolically divided into two categories that require a variety of abilities of psychological and pedagogical assistance and the creation of special learning conditions (Achkevych & Zbroi, 2020).

In the presented study, some technologies of the organisation of the educational process for children with musculoskeletal disorders will be considered. One of the technologies is the technology of remedial work. The main characteristics of the presented technology are that the lesson is a rehabilitation system, and the learning process itself is based on interest, success, and trust. It is also important to note the adaptation of the content and the adjustment of educational material based on complex details and unnecessary diversity. In the process of applying this technology, hearing, vision, motor skills, memory, and logical thinking are connected simultaneously. In the learning process, an indicative basis of actions (reference signals) is used. Definitions are formulated according to the established model, algorithms are used. Mutual learning occurs, dialogic techniques are also used. In the process of applying the technology, the overall pace of the hours is optimised for full assimilation of the material (Lloyd et al., 2016).

In addition, an important modern technology for organising the educational process is game technology. This is an independent technology for mastering the concept, subject, and even part of the subject. This is an element of a more general technology that can be used as a lesson or part of it, for example, as an introduction or a test. It can also be used as a technology for extracurricular activities. This technology is often used in the classroom to enliven the learning process and relieve stress that usually occurs during a speech. It can be used as a game of characters with elements of theatricality (Bolotova, 2020).

It is also important that differentiated learning technology is used in the learning process. The characteristic feature of this technology is that it is such a learning technology when there are children with different educational opportunities in the same class. With the obligatory achievement of basic training, it takes place at the highest possible individual level of complexity. There is also a technology of collective learning. This technology assumes a focus on the final result, the transfer of knowledge gained to each other. Cooperation and mutual assistance between students are also important. Training takes place depending on the abilities based on various subjects and tasks in the division of labour. This technology includes the implementation of collective projects, the performance of collective creative tasks, as well as the cooperation of students in the performance of practical and laboratory work (Juškevičienė et al., 2022). There are also computer technologies, including computer training programmes, which are also called interactive, can "react" to the actions of students and teachers and "enter" into a dialogue with them, which is the main

feature of the computer method of teaching (Achkevych & Zbroi, 2020).

The purpose of physical education of children with musculoskeletal disorders is to create, using corrective physical exercises and special motor modes, the prerequisites for successful daily, educational, and social adaptation to real life conditions, as well as their integration into society. The system of physical education classes for preschoolers with disabilities was developed in connection with the methodology of physiotherapy exercises. The described technologies are useful to perform with all children, that is, with both healthy and ill. The teacher should keep in mind that the creation of ideas and concepts in children with cerebral palsy may occur more slowly over several classes and with the additional help of adults. The purposeful work of a teacher in a group is one of the conditions for the integration of a child with musculoskeletal disorders into the environment of healthy peers (Kavylina & Podhorna, 2021).

All the efforts of teachers in the preparatory process for studying and the integration of children with motor disabilities will not be successful without constant contact with parents. The family should actively take part in the development of the child to ensure the continuity of the rehabilitation process. Parents should practice and strengthen the skills and abilities of children developed by professionals, if possible, help in the creation of tools for work in kindergarten and at home. The homework proposed by the speech therapist, psychologist, and teacher for performance should be clearly explained. This will ensure the necessary effectiveness of corrective work, accelerate the process of restoring impaired functions in children (Gross et al., 2018). In children with musculoskeletal disorders, the following features of psychophysical development are observed: lag in physical development; increased fatigue; delays in the development of motor skills and abilities; insufficient adaptation to physical exertion; delayed nervous reaction; complex development of cognitive experiences; in some cases it may be mental activity disorder; slow assimilation of the curriculum (therefore it is important to make an individual educational trajectory); speech and writing motility slows down; concomitant diseases are present. Considering the specific features of psychophysical development and capabilities of children with musculoskeletal disorders requires the creation of a suitable subject-developing, correcting, based on the principles of multifunctionality, morality, rationality, complexity, variability of space for the implementation of modern educational technologies (Maksimova, 2015).

All work on health improvement and physical development in an educational organisation is based on the motor regime of children of any age. Along with physical development, children learn the basics of health culture. Valeological material, organically included in the structure of various types of children's activities, contributes to the expansion of children's knowledge about the human structure, the impact of physical exercises on the body and the safety of life. Notably, in children with motor disorders, the load falls

mainly on the forelimbs and high pressure on the inner edge of the foot under the head of the first metatarsal bone, which is explained by the strong tension of the anterior tibial muscle and weakness of the big toe (Postic, 2012). This is manifested by a general increase in muscle tone of the extremities and an unstable balance of the hip joints, which requires continuous work of the back muscles, especially in the lumbar region, to maintain an upright position. In addition, asymmetry of muscle tension is the cause of instability in the presence of increased tone, athetosis, and cerebellar disorders, as a result of which the enchanted positions of the body and limbs persist for a long time (Filgueiras et al., 2022).

Many researchers have considered the problem of physical rehabilitation of children with a violation of the musculoskeletal system and modern technologies that are used in practice. For a more detailed study of the presented subject, it is important to consider some of these studies. N.P. Prokopenko (2016) defines the socialisation of children with musculoskeletal disorders, the specific features of which are determined by the social vulnerability of the assessed category of children. The problems of children with musculoskeletal disorders and their families, complicating the process of socialisation, are covered. On the example of a correctional institution, an essential characteristic of the system of additional education as a form of socio-pedagogical rehabilitation is given. The activities of institutions of additional education should be considered as a set of measures aimed at meeting the needs of children with musculoskeletal disorders in the field of obtaining information, social and cultural services, in accessible forms of creativity. Supports the spiritual and moral development of children through aesthetic education with the direct use of their artistic abilities; development of basic culture in children, self-expression, development of creative potential, overcoming the forced alienation of children from creative activity. A specially organised system of additional education, which occupies a lot of space in a correctional institution, contributes to the rapid and effective rehabilitation and, ultimately, the successful integration of a child with musculoskeletal disorders into modern society (Menshikov et al., 2022).

The paper of N.A. Gross (2018) and co-authors presents the results of the scientific activity of the laboratory of physical culture and social adaptation of disabled children for 20 years of its existence, when a socially important area of research was created to substantiate the role of physical culture in the rehabilitation of children with motor dysfunctions. The main areas and results of research are shown, the subjects of which reflect the most important problems of child rehabilitation. These include substantiation and application of technical means and innovative technologies, features of motor education of children with musculoskeletal disorders, development of effective methods of statokinetic stability and coordination of movements, the study of the impact of physical exercises on disabled children. The authors presented the results of the pedagogical activity, as well as promising areas of research.

The content of the paper by S.Yu. Maksimova (2015) concerns the methodological development of adaptive physical education of preschoolers with musculoskeletal disorders. The key positions of the developed methodology are determined by a differentiated approach. From these positions, the content of the methodology is divided into two main areas: for children with severe posture disorders and for children with serious disorder of foot arches development. This paper presents the means to improve health. An algorithm for performing physical education classes based on a differentiated approach is presented separately. The author notes that the analysis of scientific and methodological literature on the problems of adaptive physical education of children with disabilities, generalisation of their own development allowed developing a methodology for working with children with musculoskeletal disorders based on a differentiated approach, content, methodological, and organisational components of the pedagogical process. A feature of the developed methodology is the ability to carry out pedagogical influence on various subgroups of students in accordance with the severity and nature of their motor disorders.

O.A. Shestakova and A.A. Naumov (2019) cover the nature and features of cerebral palsy; shows the need for physical rehabilitation in medical, rehabilitation, and preschool educational institutions; presents: terminology, legal foundations, modern methods and means of rehabilitation; conditions for the rehabilitation of children in preschool educational institutions. The authors note that cerebral palsy is a complex disease of the musculoskeletal system that occurs due to damage to parts of the brain. Due to the complex effect of physical rehabilitation methods, it is possible to achieve a considerable improvement in well-being. Each particular case of the disease is individual and subjective, so there are no identical rehabilitation programmes. In accordance with the amendments to the Law on Education, children with cerebral palsy can, at their parents' choice, attend specialised institutions and regular kindergartens to communicate in a normal children's environment. Preschool organisations are primarily educational institutions but as far as possible they create conditions for the physical rehabilitation of these children, combining the efforts of specialists into a system aimed at correcting disabilities and developing the personal potential of each child.

N.P. Bolotova (2020) notes that in the modern socio-historical conditions of the development of the Russian educational system, the most acceptable form of a complex specialists' activity is psychological and pedagogical support. The paper covers the content of continuous comprehensive support for people with musculoskeletal disorders; the stages that ensure a continuous unified trajectory of development and learning from early assistance to a child with motor disorders to his professional selection. The growth of children with disabilities who need constant comprehensive support of medical, psychological, and pedagogical personnel is a task for the state to unite specialists of different

profiles for training, development, training, and socialisation in the context of inclusive education of children with special needs with musculoskeletal disorders. The integrated continuous system includes three types of professional activity: medical, psychological, pedagogical support and includes the work of doctors, psychologists, speech pathologists, teachers, children, and parents.

The paper of N.G. Merkulova and N.N. Romanova (2014) is devoted to the problem of preserving the health of preschoolers with musculoskeletal disorders, the organisation of the therapeutic and developmental process using health-saving technologies, considering the psychophysical and age characteristics of children in this area. Therefore, competent integration and skillful and effective use of innovative health-saving technologies in teaching should be aimed at increasing the effectiveness of the educational and health-improving potential of a preschool educational organisation, the development of value orientations between teachers and parents aimed at preserving and strengthening children's health (Matviienko et al., 2023). With an existing system of health preservation pedagogy organisation, the return of spent resources is guaranteed in the form of the development of motivational attitudes for a healthy lifestyle, full physical and mental development of children with impaired functions of the musculoskeletal system (Leleka et al., 2022).

The paper of I.V. Lakomkina (2014) presents an analysis of works on the development of communication skills in children with a complex defect structure in the process of their socialisation in preschool. Properly organised physical education allows children with disabilities to acquire skills and master various motor skills, control their movements in various conditions of motor practice. The author notes that through tests, it is possible to study the effectiveness of various programmes and teaching methods, to establish how they contribute to the mental development of children, as well as to identify the degree of developmental delay. The Raven colour matrix allows determining the possibility of analysing learning skills and the development of such thought processes as attention, memory, thinking in their visual component. A special approach is required to a disabled child. To effectively manage the development of one's personality, one needs a deep knowledge of psychological patterns that explain the specific features of a child's development at any age. The child's studies involve providing him with particular assistance. Therefore, diagnostic work is closely related to developmental and corrective actions. This is the basis on which interaction with the child is built in various spheres of his life. Reliable results in studying the condition of preschoolers can be obtained only by using attractive methods of obtaining social and psychological information about the child, which supports their interest in the entire research process. The use of new rehabilitation technologies with the active involvement of parents in the recovery processes allows achieving the tasks assigned to them, correct motor and speech disorders in the child, cure his somatic sphere, which ultimately will contribute to the maximum possible adaptation.

The paper of R. Gosselin (2020) and co-authors considers the problem of diseases and injuries of the musculoskeletal system. The authors note that they have become a "forgotten burden" in developing countries. In low- and middle-income countries, most musculoskeletal diseases can be divided into one of four categories: injuries, infections, pediatric conditions, and age-related problems. Injuries worldwide account for 11% of Disability Adjusted Life Years (DALY). Almost a third of them are related to road traffic injuries; many developing countries are ill-equipped to cope with this burden. Osteomyelitis and septic arthritis are found all over the world, but LMIC also deal with other musculoskeletal infections such as tuberculosis, leprosy, and disability due to polio. In addition, poor care for the health of the mother, fetus, and newborn leads to an exacerbation of childhood diseases, such as cerebral palsy, while other conditions, such as intoe or hip dysplasia, often manifest late. Finally, the increase in life expectancy in the world has led to an increase in the number of age-related diseases. These may be degenerative conditions or the consequences of chronic diseases such as diabetes (Akhmetova et al., 2020). In general, the authors note that musculoskeletal diseases are an important but underestimated aspect of global health.

The musculoskeletal system is the most frequent source of pain in the body, and at the same time, pain is the most frequent symptom of musculoskeletal abnormalities, especially in terms of its function. Musculoskeletal disorders are also one of the most common causes of disability since they mainly affect patients of productive age. The first steps of a patient with musculoskeletal pain usually lead to surgery. Due to the fact that the issue of rehabilitation and functional disorders of the musculoskeletal system is not taught to the required extent at many medical faculties, the authors present a fundamental introduction to functional disorders of the musculoskeletal system and their prevention, diagnosis, and treatment options for general practitioners (Jesenická & Šarmírová, 2017). The paper of N.E. Abdrakhman (2020) is aimed at reviewing the literature on the world experience of social work with children with musculoskeletal disorders. The author conducts a literary review in the paper, considering questions about social work with children with musculoskeletal disorders. The author also analysed information about the main areas of social work with children with musculoskeletal disorders. The foreign experience of social work with children with musculoskeletal disorders and the world experience of social work in this area were considered.

Conclusions

Musculoskeletal disorders are noted in 5-7% of children and may be congenital or acquired. Anomalies of development in children with motor pathology are characterised by impressive polymorphism and dissociation according to the severity of various disorders.

Comprehensive support for children with musculoskeletal disorders is interdisciplinary in nature since it is at the intersection of medicine, pedagogy and special, pedagogical, and social psychology. This suggests that for the development and establishment of a disabled child, the involvement of such specialists is necessary: a neurologist, a logopaedist, a special psychologist, a teacher, an educator. The practical value of the study consists in the fact that this study can be used as a basis for subsequent research, as well as for a comprehensive study of the presented problem. In the presented study, some technologies of the organisation of the educational process for children with musculoskeletal disorders were considered. One of the technologies is the technology of remedial work. In addition, an important modern technology for organising the educational process is game technology. It is also important that differentiated learning technology is used in the learning process. There is also a technology of collective learning. This technology assumes a focus on the final result, the transfer of knowledge gained to each other. There are also computer technologies, including computer training programmes, which are also called interactive, have the capability to "react" to the actions of students and teachers, and "enter" into a dialogue with them, which is the main feature of the computer teaching method.

The analysis of literary sources was the most important method that was used in the research process. It allowed for a qualitative study, as well as subsequent analysis of the work of other researchers. This allowed formulating certain conclusions and obtain the necessary information that can become the basis for subsequent research. The analysis of literary sources allowed comprehensively studying the problem of musculoskeletal disorders and considering various modern approaches to teaching children with such problems. This work can be the basis for further research on this issue.

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