



THE ROLE OF KINESITHERAPY AS PREVENTION AND MOTOR CONTROL OF POSTURAL DISORDERS IN ADOLESCENTS

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ABSTRACT

Postural disorders are among the most common musculoskeletal problems of adolescents, which adversely affect their physical and mental development.

The purpose of the study is to conduct a screening for the detection of postural disorders and determine the correct approach for correction through a kinesitherapeutic program to improve motor control in case of impaired posture and musculoskeletal imbalance.

Material and methods: The study was conducted in 2022-2023 in Plovdiv, 244 adolescents aged between 7 and 18 years, 57.8% (n = 141) girls and 42.2% (n = 103) boys, were studied. Special tests for spinal dysfunctions were applied, and prophylactic measures for neuro-postural remodeling were recommended. Statistical methods were used to illustrate the obtained results.

Results: An analysis of the posture was made as a result of the condition of the muscles, fascia, mobility and type of spinal dysfunctions. We found increased thoracic kyphosis in 32.3%, kyphoscoliosis – in 26.2% and lumbar lordosis – in 13.5% of the examined. A kinesitherapy program was drawn up and approved in accordance with the findings of the functional examination. Original rehabilitation algorithms for the prevention of impaired posture have been promoted, including physical exercises for the correction of the deformity, which depends on local factors and is subject to neuro-humoral regulation.

Conclusion: Successful prevention and correction of impaired posture depends on early detection establishing the causes, type, degree and severity of the dysfunction. The possible therapeutic approaches and prevention of postural disorders at a young age to overcome spinal deformities with motor activity and targeted kinesitherapy are analyzed.

Keywords: kinesitherapy, posture, spinal distortions, musculoskeletal problems,

INTRODUCTION

The role of kinesitherapy, with its unlimited preventive, restorative and health possibilities, is becoming increasingly significant in the public health care system.

Currently, more and more attention is paid to the health of future generations, but despite this, a significant deterioration in their health is observed. Most of them suffer from diseases of the musculoskeletal system, the main cause of which is the lack of motor activity. One of the solutions to this problem is the kinesitherapy method, which allows the restoration of the proper functioning of the muscles and the physiological position of the joints [1]. Kinesitherapy is considered a system of activities for recovering physical and intellectual abilities, improving the functional state of the organism, improving physical qualities, psycho-emotional stability, and mobilizing adaptation mechanisms through active and passive kinesitherapy, natural and performed physical factors, and balneo treatment and therapy [2]. According to modern concepts, kinesitherapy is defined as a part of functional therapy [3], with all types and forms of movement as a healing factor aimed at preventing and restoring the functions of all organs and systems in the human body. It leads to improvement of the general physical and psychological condition, as well as the proper functioning of the bone-joint apparatus, nervous, cardiovascular and respiratory systems [4]. Kinesitherapy solves curative, prophylactic, restorative and rehabilitation tasks. Their achievement with the help of physical exercises is carried out by stimulating and activating the healing processes [5]. The need for prevention, physioprophyllaxis and the creation of health promotion programs is becoming more and more urgent [6]. Communication skills are a significant part of medical practice, with a leading role for the general practitioner/GP and its screening function in the healthcare system [7].

The prevention of postural and spinal disorders is an important factor in public health care due to their significant increase. The reason for this drastic increase in spinal deformities is rooted in the modern sedentary life-

style since childhood, leading to reduced motor activity. According to Filkova (2017), conventional kinesitherapy methods for building and improving the motor stereotype for correct posture do not yield the desired result. This is a reason to look for and apply new methods that are more effective and motivating for children [8].

Posture is a mirror of health and is determined by the condition of the muscles and fascia and the mobility of the joints, which depends on local factors and is subject to neuro-humoral regulation.

A screening study by R. Paskaleva (2017; 2021) in children of preschool age proves the wide spread impaired posture-postural disorders in 65.41% and 12.2% - of overweight, which confirms the thesis of a number of authors about insufficient motor activity in adolescents [9].

At the present day, the treatment of this disease has as its goal the prevention or correction of spinal deformities [10]. Positive results are also observed from programmed corrective training on postural disorders in the lumbar and thoracic region [11]. Many postural abnormalities occur in childhood and adolescence. In children, whole-body posture is influenced by physical development, which depends on nutritional, congenital, and environmental factors [12].

The purpose of the study is to conduct a screening for the detection of postural disorders and determine the correct approach for correction through a kinesitherapeutic program to improve motor control in case of impaired posture and musculoskeletal imbalance.

MATERIALS AND METHODS

The study was conducted in Plovdiv from November 2022 to December 2023 during organized clinical examinations for screening studies. 244 adolescents aged between 7 and 18 years, 57.8% (n = 141) girls and 42.2% (n = 103) boys, were studied. The average age of the examined persons was 13.2 years. The functional examination

included anamnesis, examination in combination with special tests for spinal dysfunctions: cervical, thoracic and lumbar mobility, tests of Ott, Tom-Mayer, Schober, Moshkow. Potential candidates were informed of the voluntary nature of their participation and if they agreed to participate, they would be asked to sign the free and informed consent form. Before data collection, all subjects were instructed on the kinesitherapy procedures.

The collected primary information was processed and analyzed using the statistical programs SPSS 19. Microsoft Office Excel program was used for graphical processing and illustration.

RESULTS AND DISCUSSION

We performed the assessment of the posture and the objectification of the functional status of the spine after taking an anamnesis and with a negative Adams test.

Two kinesitherapeutic methods have been prepared: classic corrective gymnastics and exercises according to the Pilates method - a modern mix of fitness gymnastics. They follow the same principles of corrective gymnastics. The difference between the two methods is determined by the conditions in which the exercises are performed. The aim of the two kinesitherapy programs is to strengthen the muscles that stabilize the posture, strengthening the new motor patterns.

Regarding somatoscopy for posture assessment, postural disorders, pathological asymmetries and muscle hypotrophy are identified in the analysis of the results. During the examination, relaxed/incorrect/posture was observed in 61.4% (n=150) and muscle imbalance in the area of the back muscles. The highest percentage of asymmetry is in the area of the shoulder lines – 49.6% (n=121). In 34.4% (n=84) of them, we found distortion in the frontal plane and 32.3% (n=79) thoracic kyphosis. Our values regarding the prevalence of postural disorders are similar to those from the specialized literature. (Table 1.)

Table 1. Results of the somatoscopy of children’s usual posture.

Segment	Head		Shoulder lines		Kyphosis		Scoliosis		Pelvis hyperlordosis	
	norm	deviation	norm	devia tion	norm	devia tion	norm	devia tion	norm	devia tion
%	86.9	13.1	50.4	49.6	67.6	32.3	65.6	34.4%	59.4	40.6
n	211	32	123	121	165	79	160	84	145	99

Some studies have reported a high incidence of postural problems. They are close to the results of a study by S. Filkova (2017), which revealed a frequency of asymmetries in the area of the shoulder girdle and forward shoulders at 46.7%, with thoracic kyphosis - 14%, lumbar lordosis - 15 being almost equally common and de-

tached shoulder blades – 15% [5].

The results of Batista M, 2016; Zheng Y, 2017; Hengwei F 2016 indicated a high prevalence of postural deviations among schoolchildren, especially forward head posture (53.5%), shoulder elevation (74.3%), iliac crest elevation (51.7%), valgus knees (43.1%), thoracic

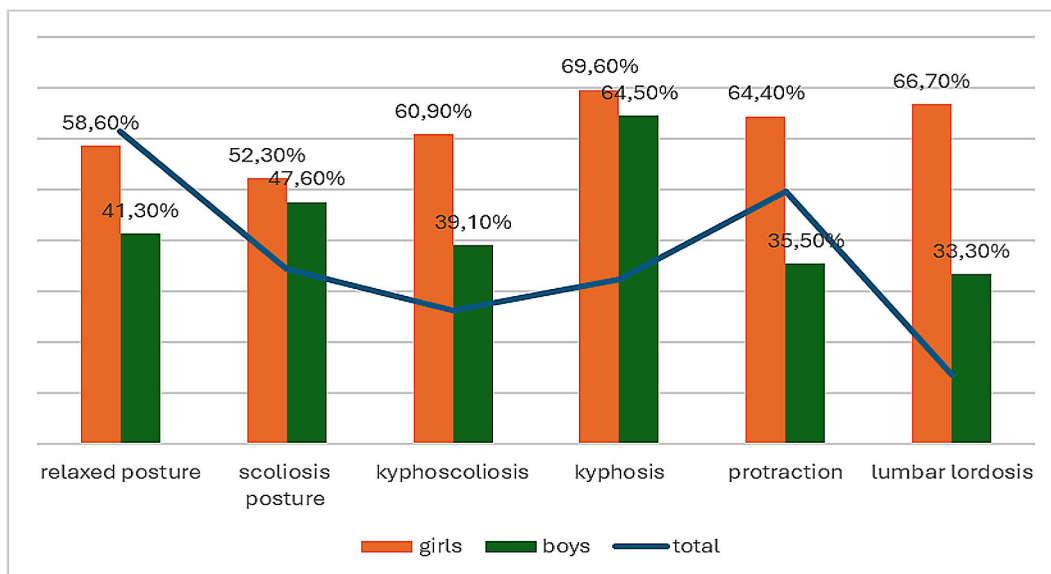
hyperkyphosis (30.2%), lumbar hyperlordosis (37.2%), and winged shoulder blades (66.3%) [13, 14]. According to age and gender, 14- to 15-year-old girls had the highest prevalence rates (13.81%) [15]. According to Resende, B. (2023) postural alterations are highly prevalent among the students. The most affected body segments are the head, spine, hips, trunk, and abdomen [16].

The most common asymmetries we found were typical for this age. These are deviations in levels and symmetries in the area of the shoulder girdle and shoulder blades. In the area of the shoulder contour, protraction of the shoulders is most often observed in 49.6% of the examined children. We found increased thoracic ky-

phosis in 32.3% (n=79), kyphoscoliosis – 26.2% (n=64) and lumbar lordosis – 13.5% (n=33) of the examined.

Divided by gender, the number of girls in the studied adolescents with impaired posture prevails. The study's results first included girls with disturbed /relaxed/ posture (58.6%). Most often, the posture is the result of weak muscles changes in different parts of the spine - scoliosis (52.3%), kyphosis (69.6%) and lordosis (66.7). In boys, kyphosis (64.5%), scoliosis (47.6%) and kyphoscoliosis (39.1%) and minor asymmetry of the shoulder girdle (35.5%) were observed most often. There is no correlation between gender and the type of distortion, motor activity and posture in everyday life are important. (Fig 1.)

Fig. 1. Distribution of the studied orthostatic deformities according to type.



According to Pacheco (2023), the high prevalence rate of identified musculoskeletal symptoms in the anatomical regions of the neck, lumbar region, and shoulder raises the need for intervention in students [17].

A kinesitherapy program was drawn up and implemented in accordance with the findings of the functional examination in order to correct the posture and improve the work of the back muscles. The kinesitherapy complex necessarily includes: stretching the back and improving the range of motion in the shoulder joints, correcting the position of the neck and shoulders, strengthening the muscles of the back, abdomen and lumbar muscles. The principles of individual approach, gradualism and systematicity are used to achieve optimal results.

The implementation of specially selected exercises leads to the improvement of the condition of persons [18]. Postural changes are considered a public health problem, especially those that affect the spine, as they may predispose to degenerative conditions of the spine in adulthood [17].

CONCLUSION

In conclusion, a systematic clinical inspection of children and adolescents is needed to determine the degree of deformity and to monitor its evolution. The increased incidence of disorders of the musculoskeletal system over the years indicates the significance of early detection and treatment. Only healthy, well-built children and adolescents can meet the growing demands placed on young generations that will bring prosperity to society [19]. The results of the own study reveal a widespread prevalence of incorrect posture among children. The prevention of impaired posture and various postural disorders is directly related to the development of initiatives for the affirmation of healthy practices, engagement and the creation of an infrastructure for the practice of therapeutic physical exercises, mass sports and various motor activities on a national level. Kinesitherapy goes beyond pure therapy, it is the basis of prevention and rehabilitation, it unites all forms of movement as a healing factor.

REFERENCES:

1. Lebedeva E, Ermolayeva I, Akhmetova I. Kinesitherapy as a method of prevention of the musculoskeletal system diseases of technical areas students. In: International Scientific-Practical Conference "Business Cooperation as a Resource of Sustainable Economic Development and Investment Attraction" (ISPCBC 2019) *Atlantis Press*. 2019 Jan;90:552-554. [[Crossref](#)]
2. Bogomilova S. [Kinesitherapy in Health Promotion and Management of the Disease.] [in Bulgarian] *Health Economics and Management*. 2020 Apr;19(3):16-21. [[Crossref](#)]
3. Nenova G. [The European perspective on kinesiotherapy in public health and Bulgarian realities.] [in Bulgarian] *Social medicine*. 2016; 24(1):42-44. [[Internet](#)]
4. Nenova G. [Kinesiotherapy in public health] [in Bulgarian] Medical University - Varna, STENO Publishing House. 2016, pp.27-30.
5. Paskaleva R. [Kinesitherapy and art therapy for diseases in childhood] [in Bulgarian] EX-PRESS Gabrovo Publishing House 2020, p.13.
6. Mihaylova V, Ivanova I, Alakidi A, Kilova K, Liochkova M. Physical Activity and Rehabilitation – A Key to Healthy Aging. *Acta Medica Bulgarica*. 2021 Nov;48(4):62-68. [[Crossref](#)]
7. Alakidi A, Mihaylova V, Lyochkova M. [Communication between the physician and the patient as a main function in the practice of general medicine.] [in Bulgarian] *General Medicine*. 2023; 25(2):37-44 [[Internet](#)]
8. Filkova S. [Prevention of spinal curvatures in preschool children.] [in Bulgarian] [dissertation] MU - Varna. 2017. 78 p.
9. Paskaleva R. [Prevention and control of postural disorders in childhood - a mission possible.] [in Bulgarian] [Monograph] EX-PRESS Publishing House Gabrovo. 2021. 93-99 p.
10. Scaramuzzo L. Special Issue: Spinal Deformity: Diagnosis, Complication and Treatment in Adolescent Patients. *J Clin Med*. 2023 Jan 9;12(2): 525. [[PubMed](#)]
11. Bogdanoviæ Z, F. Mavriæ, A. Mavriæ. Effects of a Programmed Corrective Training on Postural Disorders in Lumbar and Thoracic Region. *IJSPE*. 2017; 3(1):7-13 [[Crossref](#)]
12. Levangie P, Norkin, C. Joint structure and function: a comprehensive analysis. *Philadelphia: F. A. Davis Company*; 2005. 27 p.
13. Batistão MV, Moreira, RD, Coury HJ, Salasar LE, Sato, TD. Prevalence of postural deviations and associated factors in children and adolescents: a cross-sectional study. *Fisioter Mov*. 2016 Oct-Dec;29(4):777-786. [[Crossref](#)]
14. Zheng Y, Dang Y, Wu X, Yang Y, Reinhardt JD, He C, et al. Epidemiological study of adolescent idiopathic scoliosis in Eastern China. *J Rehabil Med*. 2017 Jun 28;49(6):512-519. [[PubMed](#)]
15. Hengwei F, Zifang H, Qifei W, Weiqing T, Nali D, Ping Y, et al. Prevalence of idiopathic scoliosis in Chinese schoolchildren: a large, population-based study. *Spine (Phila Pa 1976)*. 2016 Feb;41(3):259-64. [[PubMed](#)]
16. Resende BB, Almeida PS, Silva MA, Santos PS, Ávila MV, Guimarães AC, et al. Prevalence of postural changes in school children and adolescents. *Acta Ortop Bras*. 2023 Jun 9;31(spe2):e262255. [[PubMed](#)]
17. Pacheco MP, Carvalho PJ, Cavalheiro L, Sousa FM. Prevalence of Postural Changes and Musculoskeletal Disorders in Young Adults. *Int J Environ Res Public Health*. 2023 Dec 17;20(24):7191. [[PubMed](#)]
18. Mitova S, Gramatikova M, Nenova G, Bogomilova S. Approbation Of Physiotherapeutic Method In Lumbosacral Pain Syndrome. *J of IMAB*. 2020 Oct-Dec;26(4):3432-3435. [[Crossref](#)]
19. Bjelica B, Aksoviæ N, Bubanj S, Milanoviæ L. Prevalence and problems caused by postural disorders: A review. In: *Book of Proceedings, International Scientific Conference Contemporary Challenges in Sport, Physical Exercising Active Lifestyle. Belgrade, Serbia*. May 14-15 2021., pp.224-231. [[Internet](#)]

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