DOI 10.36074/logos-31.10.2025.043

CORRECTION OF POSTURAL DISORDERS IN ADOLESCENTS USING PHYSICAL EXERCISE EQUIPMENT

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Abstract. *The article is devoted to the urgent problem of preserving and strengthening the health of children and adolescents in modern conditions, where one of the key indicators of physical well-being is posture. The work emphasizes the critical importance of correct posture for the optimal functioning of the musculoskeletal system and internal organs, especially in adolescence, which is characterized by intensive growth and hormonal changes. This period is most vulnerable to the emergence and consolidation of such disorders as scoliosis, kyphosis and lordosis, caused by a complex of factors: hypodynamia, prolonged static load, inconsistency of muscle and bone development. The consequences of posture disorders go beyond aesthetics, causing chronic pain, deterioration of the respiratory and cardiovascular systems. Based on the analysis, it was established that physical training is the basis of correction. However, a number of theoretical and practical shortcomings in the modern correction system have been identified: insufficient scientific substantiation of methodological approaches, weak individualization of programs, lack of qualified personnel and low motivation of adolescents to study. The work argues for the need for a comprehensive, systematic and individualized approach to correction, which involves strengthening the muscle corset, forming a conscious stereotype of correct posture and using specialized physical education tools. It is concluded that early diagnosis, conscious participation of the child and creation of a favorable motor regime are the key to preventing the progression of deformities and are a long-term investment in the health of an adult.*

The problem of preserving and strengthening children's health is one of the eternal and most relevant in modern medicine and pedagogy. In conditions of

rapid urbanization, increasing environmental risks and the dominance of a sedentary lifestyle, this problem becomes particularly acute and remains a priority to this day. Human health is a multicomponent system consisting of physical, mental and social well-being, and is assessed by various indicators. One of the fundamental and visual indicators of physical condition is posture, and the importance of its normal, harmonious state is difficult to overestimate. Posture is not just an aesthetic criterion; it is a typical position of the human body at rest and during movement, which is formed under the influence of heredity, environment and, most importantly, the motor regime. Correct posture ensures optimal functioning of the musculoskeletal system and internal organs, minimizing the load on the spine and joints [2, 6].

Posture is a particularly important indicator of physical health and harmonious development of a person, critically important in adolescence [6]. This period is characterized by intensive linear growth (the so-called "growth spurts") and hormonal changes, which often lead to a disproportion between the rate of elongation of the skeletal system and the development of the muscular system. It is during this period that such postural disorders as stoop, scoliosis, kyphosis, lordosis become widespread and can become firmly established [4, 13]. This poses a serious threat to the formation of a full-fledged skeleton and internal systems [7].

The causes of posture disorders are a complex of various factors. For example, improper sitting at a desk, computer or smartphone, which causes muscle fatigue as a result of prolonged static load and leads to the search for "comfortable" but incorrect postures [13]. Insufficient physical activity (hypodynamia) and reduced mobility also lead to weakening of the spine stabilizer muscles [11]. Formation of bad habits due to carrying heavy backpacks or bags on one shoulder, incorrect posture during sleep, mismatch of furniture to the child's height. Imbalance in the development of the muscles of the left and right halves of the body leads to the appearance of asymmetry of muscle tone. In addition, bone structures in adolescence grow faster than muscle and ligamentous structures, to which the muscle corset does not always have time to adapt, which makes the spine temporarily more vulnerable to deformations [13].

The consequences of poor posture go far beyond aesthetics: they cause chronic back pain, respiratory and cardiovascular dysfunction due to reduced chest volume, and can also cause fatigue and headaches. Thus, early diagnosis and correction of posture is an integral part of the strategy for maintaining the health of the younger generation [10].

Posture directly depends on the state of the ligamentous apparatus and muscle tone, which allows us to conclude that in case of posture disorders, the basis of correction is the physical training of the child [1, 10]. In children, the final type of

posture, as well as the physiological curvatures of the spine (thoracic kyphosis and lumbar lordosis), is formed by the end of active growth. In other periods of life, especially during the periods of the so-called "growth spurts", the type of posture and physiological curvatures change in accordance with the previous age period, but are not finally formed. This is where such a characteristic feature as variability manifests itself in childhood, that is, the children's spinal column has good mobility [13].

The deformity is a fixed condition, which is caused by two components: firstly, it is a wedge-shaped deformation of the intervertebral discs with an eccentrically located, reduced in size nucleus pulposus of the disc, secondly, it is a wedge-shaped deformation of the vertebrae, which occurs at the level of the main and, to a lesser extent, compensatory arches [5]. Children are characterized by a predominantly weakened (untrained) type of posture, fairly well-pronounced mobility of the spine, as a result of which a significant difference in the configuration of the spine is visible in the supine and upright positions [8]. This occurs due to an increase in the height of the thoracic kyphosis and the depth of the lumbar lordosis in children, a decrease in the length of these curves and the length of the trunk. However, all of these above-described properties relate precisely to the physiological features of both the pediatric and adult spine, and not pathological changes [9].

Analyzing the current state of research and practical work in the field of correction of posture disorders in adolescents, a number of significant shortcomings and contradictions are revealed, which significantly complicate the effectiveness of the health-improving process [7]. These problems require a systematic solution to ensure the full physical development of young people. First of all, a critical shortcoming is a weak, insufficiently deep analysis of theoretical and practical methods of influencing the process of forming correct posture and correcting its already existing disorders. There is a gap between fundamental knowledge of biomechanics, physiology and specific, detailed programs of physical exercises, i.e. insufficient substantiation of methodological approaches. General complexes are often used that do not take into account the individual etiology and pathogenesis of posture disorders. Due to the lack of standardized criteria for assessing effectiveness, the unification of physical development indicators that should improve as a result of corrective exercises is weak. This complicates the objective determination of the influence of specific physical means on the dynamics of posture correction. The integration of new technologies is also imperfect, that is, there is insufficient implementation of modern diagnostic methods and innovative means of adaptive physical culture. Issues related to the formation of posture and correction of its initial disorders in adolescent boys and girls remain minimally studied. Although this age group is at the highest risk due

to intensive growth, specialized programs for the initial stage of scoliosis formation are often universal and do not take into account sexual and hormonal characteristics of development. This especially applies to the differentiated approach to the use of asymmetric and symmetric exercises for targeted alignment of muscle imbalance [3, 4, 5].

The mentioned theoretical shortcomings are further complicated by a number of contradictions at the practical level, which directly affects the quality of the provision of correctional and health-improving services. There is a contradiction between the growing demand and staffing, a shortage of qualified specialists in adaptive physical education and therapeutic physical education who have the necessary training to work with children with posture disorders. Physical education teachers in secondary schools often do not possess specific methods of therapeutic physical education, and the number of specialized instructors in polyclinics and rehabilitation centers is insufficient. There are also contradictions between modern requirements and the existing organization of classes. Modern requirements for the organization of sports and health-improving and correctional classes provide for individualization of the load, the use of specialized equipment and regular monitoring. In contrast, the organization of school physical education lessons or extracurricular sections is often massive, which does not allow for qualitative correction of posture disorders and individual improvement of the general indicators of children's physical development. The imperfection of the material and technical base and the lack of time for a detailed examination of each child exacerbate this problem. These contradictions and shortcomings create a barrier to the implementation of scientifically based correctional programs, which slows down the process of restoring children's health and reduces the effectiveness of preventive measures [3, 4, 5].

The problem of motivating children to play sports is no less important. According to WHO statistics, 80% of children have a low level of physical activity, which also requires the introduction of new rehabilitation methods that will not only promote recovery, but also increase the child's interest in following the necessary recommendations regarding physical activity [2, 11]. Successful correctional work directly depends on the conscious participation of the child (adolescent) in the process. At this age, external control from adults should give way to internal motivation and self-control. The teenager must clearly understand the purpose and meaning of each exercise, as well as the long-term consequences of incorrect posture. The formation of an internal attitude to feel and maintain the correct body position (the so-called "muscle sense") is the main pedagogical task. This awareness allows you to transfer the correct posture from a specialized hall of therapeutic physical education to everyday life - while sitting at a table, walking and resting.

The consequences of ignoring posture disorders can be serious: from aesthetic defects to functional disorders (impaired respiratory and digestive organs, chronic back and neck pain, rapid fatigue). Therefore, the correction of these disorders is a priority task, and physical education plays a key role in this. The dynamics of the formation of the musculoskeletal system depends on age and this fact must be taken into account, because with age, the spine undergoes a process of ossification, which ends by the age of 25. Thus, the earlier a posture disorder is diagnosed and physical rehabilitation begins, the higher the percentage of positive dynamics and a return to normal life [1, 10].

The issue of research, development and evaluation of the effectiveness of new methods and programs of physical culture, which should correspond to the physiological, psychological and physical capabilities of the body and have a general strengthening effect, remains important to this day. The process of physical education consists in solving such tasks as correction of posture disorders, harmonious development of all physical qualities taking into account critical periods of growth and development, achieving an appropriate level of physical condition, which will ensure a high level of physical health [1, 8].

A comprehensive approach to posture correction involves the systematic and purposeful use of various physical exercises aimed primarily at strengthening the muscular corset. Special attention is paid to the deep muscles of the back, abdominals and trunk extensor muscles. Strong and resilient muscles create reliable support for the spine. An important issue is the formation of a correct posture stereotype, i.e. teaching a teenager to feel and consciously maintain the correct body position. Increasing the flexibility and mobility of the spine occurs due to stretching of muscles that are in a state of hypertonicity (for example, pectoral muscles), and increasing the amplitude of movements in the spine. Special (asymmetric) exercises are used individually, mainly for the correction of scoliosis. These exercises are performed with a load on the weakened side of the body to equalize muscle tone and reduce curvature [1, 3, 10].

Correctional work should be systematic, long-term and individualized. It is implemented through the use of various means of physical education. These can be specialized classes of therapeutic physical education, which are conducted under the supervision of a specialist and are developed taking into account the type and degree of posture disorder, or general developmental exercises, which are included as an element of correction in daily morning hygienic gymnastics and physical education lessons. Swimming is an ideal means for correcting posture, since in water the axial load on the spine is reduced, and movements contribute to the strengthening of stabilizer muscles. Sports: Dosed and controlled inclusion of

outdoor games and various sports contributes to the symmetrical development of muscles. Also, special poses and corrective static positions are used to unload the spine [1, 3, 10].

Conclusions. Correction of posture disorders in adolescents using physical education is an integral part of their recovery and prevention. Success depends on the conscious participation of the child himself, the systematic performance of exercises and a comprehensive approach that combines specialized corrective exercises with general physical activity. Creating a favorable motor regime and forming a stable habit of correct posture is the key to a healthy future for a teenager, because correct posture, fixed in muscle memory, becomes an automatic biomechanical norm. It not only prevents the progression of existing deformities, but also serves as a reliable prevention of the development of chronic diseases of the musculoskeletal system and internal organs in adulthood. Thus, investing time and effort in physical education in adolescence is the best long-term investment in human health.

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