

## **THE PROBLEM OF POSTURAL DEFECTS IN CHILDREN AND ADOLESCENTS AND THE ROLE OF SCHOOL TEACHERS AND COUNSELORS IN THEIR PREVENTION**

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### **Keywords:**

- body posture defects,
- youth,
- school nurse,
- school medicine

### **Abstract:**

The body posture defects, both in children and adolescents, are an important problem of public health and also a challenge for primary care and teaching environment. A school nurse plays the key role in the diagnosis of body posture defects. The aim of the study is to assess the frequency of postural defects in children and adolescents and the role of the school environment in their prevention. The results of screening tests in students indicate numerous irregularities in the osteoarticular system, and thus the occurrence of defects of body posture. Implementation and exercising of corrective gymnastics seems to be a key compensating and repairing activity, enabling the inhibition of changes progression. However, there are certain obstacles, reducing the chance for early implementation of these activities. The lack of medical examination of students in last grades of primary school and high school may delay the detection of body defects and may result in permanent abnormalities. This can lead to deformation and, consequently, high costs of treatment and rehabilitation. The proper choice of secondary school has a significant influence on the future of a young person, as the occurring body defects prevent from performing certain professions, however, the young person becomes aware of such contraindications once the decision about the school has already been made.

## **INTRODUCTION**

Low levels of physical activity undertaken by children and adolescents, in particular young people from secondary schools, is not without significance for the posturogenesis process, that is the development of the osteoarticular system, and thus future development of the body. Postural defects in both children and adolescents are an important public health problem and also a challenge for the primary care and education system.

Kasperczyk defines the body posture as a system of individual sections of the body unaffected by pathological changes, providing optimal stability of the body requiring minimum muscular effort and "creates the conditions for optimum positioning of internal organs" [1]. In other words, it is a way of keeping the individual in a relaxed standing position, and the external manifestation of this is the mutual spatial arrangement of various parts of the body and the silhouette of a person. Body posture is similar in all people, but not identical - it is an individual characteristic. Therefore, the distinction between normal and abnormal posture is sometimes difficult [2]. Body posture is a motoric habit shaping against

a specific morphological and functional background, and associated with daily activities of the individual [3].

Referring to the data of the Ministry of Health (MZ) [4], children and young people in Poland are guaranteed preventive health care involving, among others, systematic control of their physical, mental and intellectual development. An important element of this care is health education and health promotion. The study period is, in fact, the best time during which the child learns to take care of their health and the health of others. Health care for school-age children is exercised by:

- primary care physician - in the clinic;
- dentist - in the clinic;
- the school nurse (if the school does not have a nurse, the care is given by a nurse at primary care clinic). A school nurse or hygienist is responsible for the provision of care for children and youth, who are covered by compulsory schooling and learning. These are students from 6 to 19 years old (since the start of the annual compulsory pre-school, until the last class of secondary school).

During the school years there are two critical stages in the development of body posture. That is the age when a child goes to school and the period of puberty. There are also some risks to the quality of the body posture, occurring during the so-called puberty surges, falling for the period of 6-7 and 12-16 years old, when the child is most vulnerable to the impact of various external factors and the development of the muscular system is not keeping pace with the rapid growth of the bones [2,3,5]. Morphological and functional development of the locomotor system, as well as ones work and lifestyle, lead to the formation of appropriate shape and arrangement of various elements of the body that are generally recognized as body posture. In general, speaking about the posture we mean the shape which is proper to a person standing freely in a usual upright position [6]. Therefore, the school (along with the family), as another natural environment of a human life, carrying out its tasks should provide for a child not only good models, but also ensure proper physical development, including the development of good posture.

### **AIM OF THE STUDY**

The aim of the study is to evaluate the incidence of posture deficiency in children and youth and to show the role of education workers in their prevention.

### **DESCRIPTION OF THE PROBLEM**

Research on the prevalence of postural defects in children and adolescents is most often based on the results of screening tests performed by the school nurse. Epidemiological data on the prevalence of posture deficiency is different depending on the method and techniques of screening tests. School nurses carry out screening tests according to the methodology set out by the Institute of Mother and Child (IMiDz), an orthopedic doctor examines abnormalities that require further specialist treatment, physiotherapist and corrective gymnastics teacher assesses the child for the implementation of appropriate corrective exercises. [7]

Drzal-Grabiec in 2009 conducted comparative studies of two methods of assessing body posture, ie. medical examination and photogrammetric survey using projection moiré phenomenon [8,9]. After obtaining the results at both phases of the research, the author calculated the numerical and percentage distribution of postural defects in the study population and their percentage of compliance. The convergence of medical diagnosis and photogrammetric survey results occurred in almost 30% of patients. The moiré method is non-invasive and can be a basis for planning a rehabilitation program, and repeating the test once a year may allow the assessment of the progression or regression of previously recognized defects.

In this method, the analysis covers several dozen of parameters assessing the condition of the spine, pelvis and legs in all directions, so you can get the exact spatial insight into the figure of the child under examination [10]. The undeniable advantages of TPC include non-invasiveness and safety of testing, the possibility of rapid and accurate assessment of body posture in three planes, the ability to store data on the storage media, as well as acceptance of the studies by children and young people at school age [11].

Posture is a feature variable between individuals, depending on environmental, regional, local and family factors, shaping it differently in the course of ontogeny. Faulty posture is defined as a condition in which the deformation of the spine, chest, pelvis, legs, is inconsistent with the criteria of a good functioning of the body, and sometimes also with aesthetic standards [6]. The results of the screening tests obligatory for children in primary school, lower secondary school and high school are alarming. Appearing in recent years scientific reports on this issue show an upward trend in posture defects, and it is defined by some authors as a social epidemic [7,12]. Body posture defects, especially in children and adolescents, have been of concern for many years among the researchers, and they affect 3-15% of population [13].

Postural defects result from incomplete adaptation to bipedal posture, which is phylogenetically young. Nowadays many postural defects develop also as a result of lifestyle imposed by the school. Wearing a briefcase with books in one hand, sitting in the school desks of inadequate size or shape and in an abnormal asymmetric position, spending a lot of time in a sitting position (sometimes incorrectly, with a bow bent trunk or on the "holiday" furniture) at the TV, cause postural problems resulting from habitual positioning of the entire body [6]. The most common defects include round, concave, round-concave, flat back, valgus and varus knees, flat feet and flat-lopsided, as well as scoliosis.

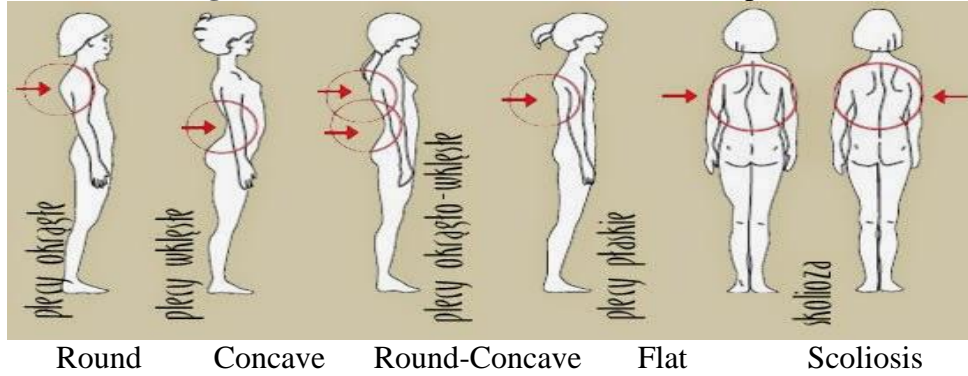
Screening tests are used in order to detect disorders of the musculoskeletal system in this period of life of the subject, which will allow to reverse the disease process or inhibit its development [14].

Lack of physical activity in childhood and adolescence results in: regression of efficiency and physical fitness of children and youth, increasing the incidence of disorders associated directly or indirectly with low levels of physical activity, particularly overweight and obesity, disorders of the musculoskeletal system; the occurrence of back pain, pain "typical" for adults (almost every day or more often than 1 time a week about 10% of young people aged 11-15, 13% of 16-year-olds and 15% of 18-year-olds feel it) [15].

Data on the prevalence of abnormalities of posture is very diverse. This is due to a variety of diagnostic criteria, different age of the respondents, as well as the experience of researchers [14,16,17]. Percentage of children attending schools with posture defects according to Jodkowska [14,16] is 57%, and these values are higher than in the studies by Macialczyk-Paprocka [7]. In comparison with the above results, this study showed that 18.4% of postural defects affect children in primary schools, and 24% in secondary schools. Preliminary results of the study concerning the evaluation of posture in children of primary school done with surface topography (TPC) showed that 50.57% of the study population of children has the correct posture. This means that almost half of the students had postural defects, of which most frequently diagnosed were the defects of lower limbs and defects in the sagittal plane.

Some studies point to the fact that the problem of the occurrence of postural defects applies to 20% -40% of children and adolescents, but there are also publications giving much higher values [18,19].

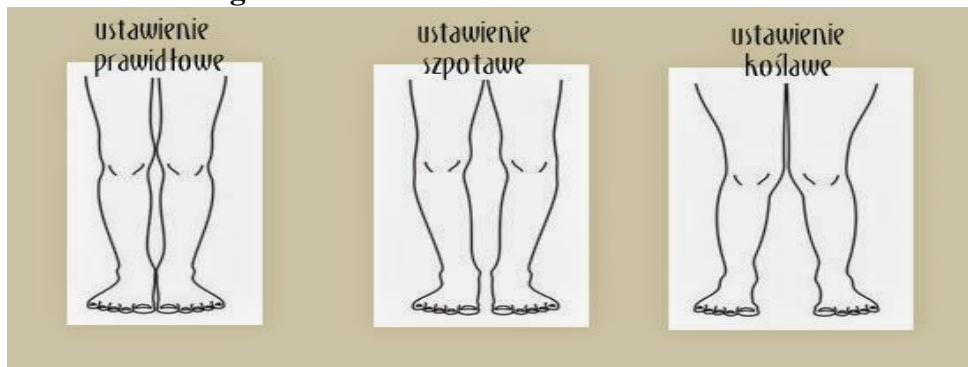
**Figure 1.** Postural defects of the back and spine



Round      Concave      Round-Concave      Flat      Scoliosis

Source: <http://vikisiezna.blogspot.com/2014/05/wady-postawy-u-dzieci.html>

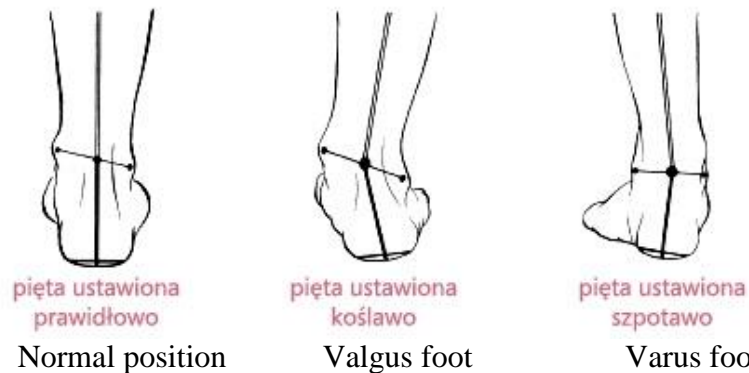
**Figure 2.** Postural defects of the lower limbs



Normal position      Varus knees      Valgus knees

Source: <http://vikisiezna.blogspot.com/2014/05/wady-postawy-u-dzieci.html>

**Figure 3.** Postural defects of the feet



Normal position      Valgus foot      Varus foot

Source: [http://www.aurelka.pl/Informacje-3-Dla\\_rodzicow-59-Najczesciej\\_wystepujace\\_wady\\_postawy-96.html](http://www.aurelka.pl/Informacje-3-Dla_rodzicow-59-Najczesciej_wystepujace_wady_postawy-96.html)

Conditions of the external environment in which a child resides (the third track of corrective conduct) have a significant impact on the child's posture. In this area a lot depends on the knowledge and activity of the organizers of the environment, that is parents and teachers. It is the foundation of the entire educational and social activities in the corrective process [3]. Importantly, in the context of education parents should realize that the perception of the child's silhouette by the child and engaging in the work on the proper posture should be shaped from an early age by their parents, because they are the first teachers of the proper health habits, and thus, the success of the treatment process largely depends on the determination of the parents [20,21,22].

The age of physical development is marked by a gradual increase of energy resources that are provided in the course of anaerobic metabolism. The effect of these changes is the increase of human capacity to perform short-term efforts of the maximal and submaximal power. By the end of maturation, these abilities are close to adult strength capacity [23]. Important, therefore, is to stimulate locomotor activity already in childhood, because the beneficial effect of physical activity on human health, especially children and adolescents, is well known and proven scientifically, and what is important, it influences the adult life.

Any deviation from the normal mental and physical development occurring in pupils is classified in pediatrics into groups of identical health problems called hospital care groups. People diagnosed with musculoskeletal abnormalities are classified into hospital care group, which contains information on postural defects, and any deviations from the correct body posture in the school environment are known under that name [7].

In all cases of posture deficiencies it is underlined that the effectiveness of the corrective and therapeutic treatment depends on the complex activities, such as: the child itself (as one of the manifestations of their self-creation), the family, peers, didactic and educational environment. This is possible thanks to the full information campaign of all the above and consistent compliance in any situation with the set of recommendations and contraindications [3].

Both the doctor and the nurse (hygienist) see each child rarely and in specific circumstances, not always conducive to a peaceful observation of the child's posture in different conditions and situations. In contrast, this possibility has the teacher who, on the one hand can quickly and easily see small deviations from the norm - if the one would know what they are; on the other hand – a child with a known deficiency will be easier to treat and diagnose objectively. The teacher's task is also to encourage children to obey the therapeutic and corrective recommendations. It is crucial, of course, to establish constant cooperation of the teacher with the doctor and school nurse (hygienist) [24].

Prevention of postural defects is a complex procedure of securing general health both physical and mental. This problem is particularly important in children and young people, because during the maturation growth the posture easily disorders and the posture developed during this period prevails largely throughout life [25].

A group of disorders, on the background of muscle dystonia, remains within the impact of schools with a special focus on the correction activities and physical education, as well as in cases of greater severity of defects - in clinics and rehabilitation centers, since the main objective is to prevent the identified faulty posture and correction of physiological deviations. Any preventive measures, as well as corrective and compensating are an integral part of the school curriculum and extracurricular activities [3,25].

As mentioned above, cooperation of all members of the school environment is crucial, but the role of the school nurse in this respect is particularly vital, because she is often the only member of the school personnel, who has a thorough medical and interdisciplinary preparation, qualification course or specialization in the field of school nursing. It is these competencies that ensure the holistic nursing of the students in the school, both in terms of prevention and corrective activities.

## **SUMMARY**

To summarize, citing the Ministry of Health (MZ) [2], the activities of a school nurse (school hygienist) in the prevention of postural defects include:

- Carrying out screening tests in terms of physical development with particular emphasis on the musculoskeletal system and organs of sight and hearing;
- Directing the post-screening proceedings for the students with a positive screening test;

- Conducting health education for students (providing information and guidance on the rules of hygiene, health behaviors, and self-control and self-observation);
- Cooperation with parents and teachers in planning and implementation of activities for the students enrolled by a doctor to particular groups of physical education and physiotherapy exercises.

Both research and our own observations allow us to conclude that the youth from sports classes, physically active or practicing a particular sports discipline, are characterized by a higher motor efficiency and correct posture compared to the hypokinetic youth.

Proper diagnosis of the level of child development should be based on the knowledge of the dynamic processes of growth and maturation, as only so we can speak about proper prevention and planning of the further development of the child, including the corrective - compensation activities [7]. Importantly, interpreting the results of prophylactic or orthopedic testing we should take into account the subjectivity of the evaluation and the existence of disparities in judging about the severity of the defects (over-interpretation of some defects such as scoliosis). It often happens so that the same irregularity of the posture evaluated by several specialists results in divergent results. A margin of error is possible by virtue of that subjectivity, but there are, however, certain criteria and typical features of defects, which should leave the person making the assessment in no doubt.

Incorrect posture assessment or failure to detect early changes may result in their consolidation, and over-interpretation will result in overstating the statistical data on the incidence of defects. We should, therefore, consider the possibility of incorporating the TPC as a standard prophylactic examination, in addition to evaluation by professionals through the screening tests. Despite the still relatively low cost of such an examination, it may contribute to an early, quite accurate detection of the defects, reduction of the margin of error of the assessment during the screening, and above all, reduction or elimination of the cost of subsequent treatment or rehabilitation. Under the principle "prevention is better than cure" such action appears to be the only rational.

The concept of a new model of medical care for students in the school assumes that in the protection and promotion of health should be involved parents and students, as well as the school and health care personnel. The main task is to incorporate them into all the health care activities, because they bear the greatest moral and legal responsibility for the health of their children [26,27].

## **CONCLUSIONS**

1. In the process of diagnosing and correcting the posture in children and adolescents should be involved not only a doctor and a nurse, but also a physical education teacher, and teachers of other subjects.
2. Posture is the result of motor habits both at school and at home, so it is important to work with the parents.
3. Lack of the overall medical examination of students in the final year of junior high school will lead to late detection of the defects and may result in their deepening or consolidation.
4. The choice of the secondary school before carrying out the overall medical examination of a 16-year-old child, results in making wrong decisions about choosing a profession, which later will prevent the student from having this profession due to the student's health conditions.

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