613.97:796.011.3-057.87

POSTURAL DEVIATIONS OF STUDENTS IN THE PROCESS OF PHYSICAL EDUCATION AT THE ACTUAL STAGE, AS A SCIENTIFIC PROBLEM

***Vintonyak Oleg*[1],**
***Lopatski Sergey*[2],**

[1]PHEI Galician Academy, Ivano-Frankivsk, Ukraine
2Ivano-Frankivsk National Medical University, Ivano-Frankivsk, Ukraine

***Abstract. The** article is devoted to the analysis and generalization of scientific knowledge concerning a state of students' posture in the course of physical training at the actual stage. Regulation of gravitational interactions of the person with a support at a vertical pose in many respects depends on features of a biogeometrical profile of posture. The analyzed data demonstrate that increase in number of students with postural deviations can create further a problem situation as potentially unfavorable effect of this state by all means turns sooner or later inevitably leads to decreasing of functional capabilities of organism of a single individual.*
***Keywords:** physical education, students, posture, deviation.*

Introduction. According to the accepted ideas [4], the education period in higher education institution is the most important period of a person's socialization. It is worthy to note that transformation of educational process reflects in features of adaptation processes and, respectively, state of health of the students that are engaged in mainly intellectual work and spend a lot of time at the computer [8, 11, 13].

The analysis of special scientifically-methodical literature allows affirming that the health of student's youth is one of exact indicators of state of health of the population of the country in whole, as well as the major value which defines wellbeing of society [1, 2].

In the last decade in Ukraine there is a decrease in level of health of student's youth that is caused by a number of the objective and subjective reasons: conditions of educational activity, low social and economic level of life of a greater part of students, deficiency of motive activity and as a result of it, – increase in number of the student's youth having disorders of biogeometrical profile of their posture [2, 9, 10, 13].

Methodology and organization of research

The purpose of research – to analyze and generalize scientific knowledge concerning a condition of posture of students in the course of physical training at the modern stage.

Research methods: analysis of scientific and methodical literature and Internet sources.

Research results and their discussion

In scientific researches of the last decade it is reasonably proved that abnormal posture – is not only non aesthetic appearance of a person, but also a basic reason for development of chronic diseases [9, 10, 13]. It is known that spine curvature causes a disfunction of peripheral nerves in certain zones for which activity each segment of a vertebral column is responsible[5, 9, 12]. In its turn, it can promote formation of changes in some other organs and systems with the subsequent development of chronic pathology [7]. It is important to note that from the point of view of physiology it is quite natural as the condition of a vertebral column which reflects in a posture in many respects defines possibilities of normal functioning of internal organs. Besides, it is necessary to emphasize that it is connected with influence on spatial position of internal organs and with the peculiarities of their innervations

[4, 13]. In a number of researches [2, 5, 7] it is noted that postural deviations not only influence on internal organs, but often lead to formation of permanent deformations of other components of the musculoskeletal system (MSS).

In new training conditions a first-year student remains "the yesterday's school student" whose all physiological systems of an organism are still continuing to grow and mature [4, 8, 12]. It should be noted that at the considered age the musculoskeletal system undergoes a number of anatomy physiological changes, and as a result this period is considered critical for the development of LMA [11]. It is notable, that at this time there is an active growth of a backbone in length (in girls – till 18 years, in young men – till 20-21), and curves of a vertebral column are formed [14]. It is necessary to emphasize that the final differentiation and accumulation of bone weight are proceeding, there are processes of full accretion of shoots with a body of a vertebra, ossification of cartilaginous edges, formation of articulate surfaces, capsules, ligaments, that is especially important to consider when selecting physical loadings [4, 6, 12]. Except that, at this age period there is a growth of muscles in length. It is important to note that a strong, but the unilaterally developed muscular system at teenage age can also lead to different deviations of a vertebral column [8]. In our opinion, the considering of this factor in the organization of preventive activities with students in the process of physical education can open new prospects to increase the efficiency of health-enhancing process.

According to the data of N.A. Zelenskaya [5], the most often diagnosed pathology in junior students of medical higher education institution is functional and structural changes of support and movement organs. Prevalence of postural deviations at students varies in the range from 50 to 60%; in female students the postural deviation is on type of a plane-concave back, in 35-40% of cases that is caused by multifactor influences (hipokinesis, development of irrational static and motor stereotypes, insufficient motivation to practice sport) [5].

In the research of Y.I. Retivyh [16] determinants of postural deviations in young people during their training in a higher education institution are defined: the insufficient motive mode (51,6%), low level of a physical state (48,4%), the wrong physical education (43,8%), diseases (39,1%), violations of hygienic conditions of the mode of study and work (34,4%), heredity (29,7%), low motivation to form the correct posture (24,9%). In author's opinion [16], the main and key link in a chain of these reasons is a lack of motive activity. Unfortunately, the majority (63,4%) of surveyed realize this indicator for only 40 – 50% of age norm [16]. In such a way, the low level of motive activity, in opinion of the expert with which it is necessary to agree leads to postural deviations, leads to deterioration in physical condition of a young person [16]. The fact that in research of Y.I. Retivyh is also worthy of attention [16] is a revealed structure of interrelation of indicators of morphofunctional state in different contingents surveyed.

According to the data received by the expert [16] in students with correct posture between the analyzed indicators the expert has been revealed 116 reliable interrelations. The stem part consisted of eight characteristics: weight and length of a body, Quetelet index, adaptation level, torso dynamometry, Robinson index, systolic arterial pressure and heart rate at rest. At this contingent of surveyed ten branches of distribution of results are revealed: seven mono component and three

complex ones. The highest branches have formed indicators of carpal dynamometry (a branch 1), Rufie index, heart rate, after standard physical loading (a branch 2) [16].

As the data received by Y.I. Retivyh [16] show, 91 reliable interrelations between indicators of morphofunctional state in students with postural deviations in the sagittal plane were revealed. The analyzed characteristics were divided by the scientist into three groups. The first consists of nine indicators, body weight – the central link of this group, the majority of branches – monocomponent. The second group includes eight indicators, systolic arterial pressure at rest – a central link of this group. The third group included five characteristics which were distributed in the chain [16].

The scientist revealed 90 reliable interrelations between indicators of morphofuctional state in students with postural deviations in the frontal plane [16].

The analyzed characteristics were distributed by the expert [16] into four groups. The first group consisted of five indicators, body weight – a central link [16]. The second group includes five characteristics which were distributed in a chain. The third and fourth groups of indicators consisting each of seven characteristics were distributed in a chain [16].

The received results have allowed the expert [16] to state noticeable distinctions in structure of interrelation of characteristics of morphofunctional state in the different contingents surveyed: in students with a proper posture system distribution of these indicators is revealed, and in students with the postural deviations–block distribution is shown [16].

To determine typological features of students 'posture, N.A. Kolos [12] has carried out special researches in which 125 students have taken part. The analysis of videograms of biogeometrical profile of students 'posture has allowed the expert to state the following facts: the normal posture was observed in 25 students, postural deviations in frontal plane (skoliotic posture) have been noted among 30 examinees, a round back is observed among 45 surveyed, a round-concave spine – among 10 and a flat back – in 15 examinees [12].

According to data of O.A. Martynyuk [13], only 95 out of 542 examined students had no postural deviations. Postural deviations in sagittal plane were distributed the next way: the round spine was observed in 95 students, round-concave – in 85, flat – in 73 students, the greatest number of deviations of body spatial organization has been recorded in the frontal plane: scoliosis posture was observed in 194 students [13].

Results of medical survey and screening have allowed E.A. Ponyrko [14] to make the following conclusions: different forms of postural deviations are among 73,3% of students; according to data of screening, in higher education institution the basic frontal postural deviation is met; the motor skill of the correct posture is formed only among 15% of students and decreases to 8% in preservation of a working pose; educational activity in higher education institution creates unfavorable conditions for formation of skill of the correct posture and correction of the existing deviations [14].

The study of quality of students' life with postural deviations which is carried out by O.B. Isaeva [7], has revealed reliably lower values of distinction in comparison with healthy students (tab. 1), that is shown by the total sum of points in both studied groups (120,6±11,6 and 131,2±10,3 respectively $p < 0,01$).

The qualitative analysis of indicators in students with postural deviations shows [7] reliably

lower values on scales: "Physical functioning", "Psychological functioning" and "Social-role functioning (study in higher education institution)" that demonstrates smaller satisfaction of these students with these aspects of life.

As it is noted by O.B. Isaeva [7], the comparative analysis of indicators of quality of life in dependence on the plane of postural deviations hasn't revealed essential distinctions. In both groups they demonstrated a decline in quality of life (tab. 2).

Table 1. Parameters of quality of life of healthy students and students with postural deviations, M ± m [7]

Aspects of quality of life	Assessment, point	
	Healthy students (n=98)	Students with postural deviations (n=128)
Physical functions (physical functioning)	34,9±4,4	24,3±3,9**
Psychological functions (emotional functioning)	22,3±4,2	20,6±2,2*
Social-role functions (study in higher education institution)	18,2±1,3	17,9±1,2*
Social-role functions (social activity)	8,5±2,9	8,1±2,9
Social-role functions (interaction)	20,0±3,4	19,5±3,6
Health	4,4±0,3	4,2±0,2
General point (total sum of points)	131,2±10,3	120,6±11,6**

Note. The statistical significance of distinctions between indicators of healthy teenagers and teenagers with postural deviations * – $p<0,05$; ** – $p<0,01$

Table 2. Parameters of quality of life of students in dependence on the plane of postural deviations, M ± m [7]

Aspects of quality of life	Assessment, point, at postural deviations	
	in frontal plane (n=67)	in sagittal plane (n=57)
Physical functions (physical functioning)	24,0±4,0	24,9±4,7
Psychological functions (emotional functioning)	17,3±2,6	17,6±1,8
Social-role functions (study in higher education institution)	13,2±2,2	13,8±2,9
Social-role functions (social activity)	8,1±0,8	8,2±0,9
Social-role functions (interaction)	19,5±1,2	19,5±0,7
Health	4,0±0,2	4,0±0,2
General point (total sum of points)	122,2±5,6	120,0±5,3

Students with postural deviations according to data of O.B. Isaeva [7] authentically are more often characterized by the high level of the anxiety, understated self-assessment, depression, low indicators of quality of life in comparison with their healthy peers. It should be noted that the expert [7] has revealed reliable distinctions of psychological characteristics with the accounting of the plane of a deviation of a backbone: it was more often noted in sagittal plane the high level of personal anxiety, the underestimated self-assessment, decrease in indicators of mood and

mental activity authentically .

Results of the researches of O.V. Isaeva [7] demonstrate the fact that the students with postural deviations in the frontal plane have reliably more often: high level of situational anxiety, the inadequate and overestimated self-assessment. The revealed distinctions in indicators of the psychological sphere at the different plane of postural deviations the expert explains by prevalence of parasympathetic influences at its deviations in sagittal planes and sympathetic – in frontal [7].

It is established by M. V. Dudko [2] that only 15,2% out of the examined students have correct posture, skoliotic posture has been revealed in 36,4% of examinees, a round back – in 24,4%, and a round-shouldered back – in 24% of students. The data received by the author demonstrate the fact that increase in number of students with postural deviations can create further a problem situation as the potentially adverse effect of this state sooner or later by all means turns in decrease of functional opportunities of an organism of separate individuals [2]. Express control of biogeometrical profile of posture of students carried out by the expert [2] (five indicators in frontal and six in sagittal planes) points to the fact that 63,33% examined with a proper posture have the average level of a condition of a poture, and 40% out of them get in, so-called, "a risk zone" of appearing of functional disorders of the musculoskeletal system. It is established by the expert that students with different postural deviations (skoliotic posture – 43,33%; a round back – 23,33%; a round-shouldered back – 22,73%) have the low level of a state biogeometrical profile of posture [2].

Conclusions

Data of numerous researches demonstrate the fact that the social and economic processes happening in Ukraine have led to sharp deterioration of life and health of the population of Ukraine, in particular of students.

The reason of a sudden decrease in health of student's youth, first of all, is the intensive educational activity abounding with high intellectual loadings and nervously-emotional tension.

Postural deviations of LMA are considered a functional disorder of LMA. Prevalence of postural deviations in student's youth reaches about 80% and this figure is constantly increasing.

High prevalence of functional disorders of LMA and the accompanying deviations in a state of health in students, demands development of innovative approaches to carry out correctional actions with students in the course of physical training.

References:

1. Aleshina A.I. (2015) Prevention and correction of disorders of the musculoskeletal system in preschool children, schoolchildren and student youth in the process of physical education, [Profilaktika i korekcija porushen' oporno-ruhovogo aparatu u doshkil'njat, shkoljariv ta students'koï molodi u procesi fizichnogo vihovannja], Lutsk: Phoenix, 365 sec.
2. Dudko N.I. (2016) "Prevention of violations biogeometrical profile posture of students in physical education", [Profilaktika porushen' biogeometrichnogo profilju postavi studentiv u procesi fizichnogo vihovannja], dis. na zdobuttja nauk. stupenja kand. nauk z fiz. vihovannja i sportu: spec. 24.00.02. «Fizichna kul'tura, fizichne vihovannja riznih grup naselennja» p. 227
3. Dutchak M.V. (2015) "Paradigm Wellness physical activity theoretical basis and practical application", [Paradigma ozdorovchoï ruhovoï aktivnosti: teoretichne obґruntuvannja i praktichne zastosuvannja], Teorija i metodika fizichnogo vihovannja i sportu, №2, Pp. 44-52.
4. Zvezdina M.L. (2013) "the Variety of scientific approaches to formation of healthy lifestyle of students", [Raznoobrazie nauchnyh podhodov k formirovaniju zozh obuchajushhihsja], Nauchnyj dialog, No. 8(20), Pp. 8-23.
5. Zelensky N.A. (2007) "The Functional status of students with incorrect posture in the process of physical education in the Junior years of medical University", [Funkcional'noe sostojanie studentov s narusheniem osanki v processe

fizicheskogo vospitanija na mladshih kursah medicinskogo vuza], avtoref. diss. na soiskanie uchen.stepeni kand. med. nauk: spec. 14.00.51 «Vosstanovitel'naja medicina, lechebnaja fizkul'tura i sportivnaja medicina, kurortologija i fizioterapija», p. 22.
6. Ivchatova T.V., Karpova I. B., Dudko N. V. (2013) Healthy lifestyle and physical activity of students, [Zdorovij sposib zhittja ta ruhova aktivnist' studentiv], Kiev, KNEU, 110 p.
7. Isaeva O.V. (2015) "Different approaches to improving students 16-17 years of age with disorders of posture in physical education", [Differencirovannye podhody k ozdorovleniju studentov 16-17 let s narushenijami osanki v processe fizicheskogo vospitanija], avtoref. dis. na soiskanie uchen. stepeni kand. med. nauk: spec. 14.01.08 «Pediatrija», p. 24.
8. Kashuba V.A. (2003) Biomechanics of posture, [Biomehanika osanki], Kiev: Olympic literature, 248 p.
9. Kashuba V., Bibik G., Nosov N. (2012) "Condition Monitoring of the spatial organization of the human body in physical education: background, status and solutions", [Kontrol' sostojanija prostranstvennoj organizacii tela cheloveka v processe fizicheskogo vospitanija: istorija voprosa, sostojanie, puti reshenija], Fizichne vihovannja i sport, Vol. 7., P. 10-19.
10. Kashuba V. A., Golub V. P., Rudnitsky V. A. (2013) "Characterization biogeometrical profile posture of students with different body type", [Harakteristika biogeometricheskogo profilja osanki studentok s razlichnym tipom teloslozhenija], Naukovo-pedagogichni problemi fizichnoï kul'turi. Fizichna kul'tura i sport, Vol. 12 (39), Pp. 52-59.
11. Kashuba V.A., Futorny S.M., Dudko N.I. (2015) "The use of innovative technologies of formation of healthy lifestyle of students in physical education", [K voprosu ispol'zovanija innovacionnyh tehnologij formirovanija zdorovogo obraza zhizni studentov v processe fizicheskogo vospitanija], Naukovij chasopis Nacional'nogo pedagogichnogo universitetu imeni M. P. Dragomanova, Vol. 8 (63), Pp. 28-32.
12. Kolos M.A. (2010) "Correction of functional disorders of the musculoskeletal system of students in physical education", [Korekcija funkcional'nih porushen' oporno-ruhovogo aparatu studentiv v procesi fizichnogo vihovannja], avtoref. dis. na zdobuttja nauk. stupenja kand. nauk z fiz. vih. ta sportu : spec. 24.00.02 «Fizichna kul'tura, fizichne vihovannja riznih grup naselennja», p. 20.
13. Martynyuk A.A. (2011) "Correction of disorders of the spatial organization of a body of students in physical education" [Korrekcija narushenij prostranstvennoj organizacii tela studentok v processe fizicheskogo vospitanija], dissertation. dis. on the competition of graduate. the degree candidate. physical education and sport: spec. 24.00.02 "Physical culture, physical education of different population groups", Kyiv, p. 22.
14. Petrenko N.V. (2015) "Optimizing physical and mental health of students of economic specialities by means of Aqua fitness", [Optimizacija fizichnoï ta rozumovoï pracezdatnosti studentiv ekonomichnih special'nostej zasobami akvafitnesu], avtoref. dis. na zdobuttja nauk. stupenja kand. nauk z fiz. vihovannja ta sportu: spec. 24.00.02 «Fizichna kul'tura, fizichne vihovannja riznih grup naselennja», p. 23
15. Ponyrko E.A. (2013) "Correction of posture in students of universities by means of improving kinds of gymnastics", [Korrekcija osanki u studentok vuzov sredstvami ozdorovitel'nyh vidov gimnastiki], avtoref. dis. na soiskanie uchen. stepeni kand. ped. nauk: spec. 13.00.04 «Teorija i metodika fizicheskogo vospitanija, sportivnoj trenirovki i ozdorovitel'noj fizicheskoj kul'tury» p. 22
16. Retivuh Y.I. (2009) "Method of correction of the posture of students by means of physical culture on the basis of types and extent of deformities of the spine", [Optimizacija fizichnoï ta rozumovoï pracezdatnosti studentiv ekonomichnih special'nostej zasobami akvafitnesu], avtoref. dis. na zdobuttja nauk. stupenja kand. nauk z fiz. vihovannja ta sportu: spec. 24.00.02 «Fizichna kul'tura, fizichne vihovannja riznih grup naselennja», p. 23.