

## MORPHOLOGICAL FUNCTIONAL AND PSYCHOLOGICAL INDICATORS OF 11-12 YRS AGE BOYS' (MEMBERS OF PREPARATORY SPECIAL HEALTH GROUPS OF URBAN AND COUNTRYSIDE SCHOOLS) DEVELOPMENT

Tamozhanskaya G.V.

Kharkov State Academy of Physical Culture

**Abstract.** *Purpose:* determination of anthropometrical and somatic indicators and factors of school anxiety of 11-12 yrs age boys – members of special health groups at urban and countryside schools. *Material:* in researches 50 boys of 11-12 years age participated. *Results:* the author determined difference between morphological-functional indicators and kinds of boys' diseases. Besides, attendance of physical culture classes in respect to other subjects was analyzed. Comparative factors of children's school anxiety were outlined. Schoolboys from countryside are more anxious about opinion of peers about themselves. *Conclusions:* boys' morphological-functional indicators shall be considered as factor of determination and revelation of defects in harmonious development in system of physical education. Attention should be paid to different kinds of diseases and anxiety among boys of preparatory group.

**Key words:** morphological-functional, anxiety, diseases, physical culture, boys, urban, countryside.

### Introduction

Recent years in Ukraine disturbing situation has been developing: adolescents' health and physical fitness, especially in puberty period worsen [1, 9]. It, first of all, is connected with crisis of national system of population's physical education, which does not meet international standards [15].

Main reasons of the crisis are devaluation of physical culture's, sport's, healthy life style's social prestige; underestimation of social health related and educational significance of physical culture at educational establishments; residual principle of physical culture's and sport's financing and so on. Such state of national physical culture system resulted in very low level of physical condition and attendance of physical culture classes by comprehensive schools' pupils [3, 11, 12].

During period of learning at school quantity of sick children increases 2-3 times. Quantity of children with posture's abnormalities is 80-90% from general quantity of schoolchildren [6, 17].

Counteract to negative after effects of motor functioning restrictions of adolescents can be physical culture and sports, which are important health related factors as well as factors of comprehensive development, improvement of workability and reduction of tiredness, strengthening of organism's resistance to different kinds of diseases [5, 11, 13, 20].

Researches of morphological-functional and psychological indicators of 11-12 yrs age boys of urban and countryside schools were conducted in the following directions: assessment of physical condition (I.P. Baryliak, 2000; Ye.A. Kaliuzhnyi, 2014; A.G. Platonova, 2008, 2011), influence of environment on children's health (Ye.G. Voronkova, 2001; T.V. Demydova, 2011; D.G. Myreoshkin, 2012); trends of morphological-functional development of children (V.R. Abramova, 2006; Ye.A. Raliuzhnyi, 2013; O.G. Lytovchenko, 2003; Zh.M. Mukatayeva, 2013). Alongside with it questions of increasing of 11-12 yrs age children's health (children of special health groups) indicators still have remained insufficiently studied.

### Purpose, tasks of the work, material and methods

*The purpose:* registration of changes of anthropometrical and somatic indicators and factors of anxiety of 11-12 yrs age, who attend preparatory special health groups in urban and countryside schools. *Methods of the research:* analysis of scientific-research literature; questioning; method of self-metering; medical-biological methods, methods of mathematical statistic. In the research 50 boys of 11-12 yrs age, members of preparatory special health groups, participated. The research was conducted in urban and countryside schools at the beginning (September) and at the end (May) of academic year.

### Results of the research

Health related measures are conducted insufficiently among pupils, who are members of special health groups, in schools. Physical culture classes (PC) such pupils do not attend and, thus, harm their health, facilitate diseases' progressing [4, 9, 14]. It is known that physical, psychological and mental loads shall meet age and functional potentials of adolescents. Rest periods shall ensure effective recreation of workability [16, 18]. Only in this case daily regime will facilitate harmonious development and strengthening of schoolchildren's health.

During academic year we conducted pedagogic testing of morphological-functional indicators of 11-12 yrs age boys – members of special health groups at urban and countryside schools. At urban schools PC classes were practiced 2-3 times a week, in countryside – 1-2 times. The received results are given in table 1 and 2.

Table 1

*Somatic and anthropometrical indicators of 11-12 yrs age boys of urban schools received at the beginning and at the end of academic year (n=25)*

No/No	Indicators	Academic year	
		At the beginning	At the end
		$\bar{X}_1 \pm m_1$	$\bar{X}_2 \pm m_2$
1.	Body length, cm	139.5+0.81	140.8+0.82
2.	Body mass, kg	28.4+1.01	32.0+1.00
3.	SBP, mm.merc.col. 44t.	111.9+2.24	113.7+1.30
4.	DBP, mm.merc.col. 44t	68.9+0.66	70.3+0.85
5.	HBR, b.p.m. <sup>-1</sup>	79.0+0.83	80.1+0.92
6.	Circumference of head, cm	52.4±0.33	52.7±0.22
7.	CC, cm	61.7±0.71	63.0±0.54
8.	VCL, ml	2259.8+84.82	2368.8+65.60

Notes: SBP –systolic blood pressure; DBP – diastolic blood pressure; HBR- heart beats rate; CC- chest circumference; VCL – vital capacity of lungs;

During academic year the following indicators of 11-12 yrs age boys from urban schools increased by:

- 1.3 cm (t=1.15; p>0.05) – body length,
- 3.6 kg (t=2.51; p<0.05) – body mass,
- 1.8 mm.merc.col. (t=0.70; p>0.05) – systolic BP,
- 1.4 mm.merc.col. (t=1.30; p>0.05) – diastolic BP,
- 1.1 b.p.m.<sup>-1</sup> (t=0.90; p>0.05) – heart beats rate,
- 0.3 cm (t=0.86; p>0.05) – head circumference,
- 1.3 cm (t=1.47; p>0.05) – chest circumference,
- 109.0 ml (t=1.02; p>0.05) – vital capacity of lungs (see table 1).

During academic year the following indicators of 11-12 yrs age boys from countryside schools increased by:

- 1.7 cm (t=1.25; p>0.05) – body length,
- 0.6 kg (t=1.24; p>0.05) – body mass,
- 2.2 mm.merc.col. (t=1.52; p>0.05) – systolic BP,
- 0.9 mm.merc.col. (t=1.24; p>0.05) – diastolic BP,
- 1.4 b.p.m.<sup>-1</sup> (t=1.49; p>0.05) – heart beats rate,
- 0.1 cm (t=1.16; p>0.05) – head circumference,
- 1.3 cm (t=1.24; p>0.05) – chest circumference,
- 102.0 ml (t=0.52; p>0.05) – vital capacity of lungs (see table 2).

Table 2

*Somatic and anthropometrical indicators of 11-12 yrs age boys of countryside schools received at the beginning and at the end of academic year (n=25)*

No/No	Indicators	Academic year	
		At the beginning	At the end
		$\bar{X}_3 \pm m_3$	$\bar{X}_4 \pm m_4$
1.	Body length, cm	136.4+0.87	138.1+1.02
2.	Body mass, kg	29.4+1.10	31.0+0.67
3.	SBP, mm.merc.col. 44t.	113.8+1.31	116.0+0.63
4.	DBP, mm.merc.col. 44t	74.3+2.99	75.2+0.79
5.	HBR, b.p.m. <sup>-1</sup>	78.8+0.68	80.2+0.62
6.	Circumference of head, cm	52.4±0.33	52.5±0.14
7.	CC, cm	60.5±0.81	61.8±0.64
8.	VCL, ml	1999.0+146.67	2101.2+131.45

Notes: see table 1

At the beginning of the research comparative analysis of mean somatic and anthropometrical indicators of 11-12 yrs age boys of both groups showed difference between indicators of body length (t=2.61; p<0.05) (see tables 3-4).

Table 3  
Comparative analysis of somatic and anthropometrical indicators of 11-12 yrs age boys during academic year ( $n_1=25$ ;  $n_2=25$ )

Group	Body length, cm	Body mass, kg	SBP mm.merc.col.	DBP mm.merc.col.	HBR b.p.m.	VCL ml	HC, cm	CC, cm
At the beginning of research								
Urban boys (n=25)	139.5± 0.81	29.4± 1.10	111.9+ 2.24	68.9± 0.66	79.0± 0.83	1969.0±48 .82	52.4± 0.33	61.7± 0.71
Countryside boys (n=25)	136.4± 0.87	31.7± 1.19	113.8+ 1.31	74.3± 1.08	78.8± 0.68	1864.4±32 .37	52.7± 0.22	60.5± 0.81
At the end of the research								
Urban boys (n=25)	140.8± 0.82	32.0± 1.00	113.7+ 1.30	70.3± 0.85	80.1± 0.92	2259.8±84 .82	52.7± 0.22	63.0± 0.54
Countryside boys (n=25)	138.1± 1.02	31.0± 0.67	116.0+ 0.63	75.2± 0.79	80.2± 0.62	1999.0± 146.67	52.7± 0.17	61.8± 0.64

Notes: see table 1

With it indicator of body mass of 11-12 yrs age countryside boys was 31.7 kg, that was by 2.3 kg more in respect to boys of main group ( $p>0.05$ ) (see table 4).

Table 4  
Matrix of statistic confidence of morphological-functional indicators of 11-12 yrs age boys from urban and countryside schools at the beginning of academic year ( $n=50$ )

Groups	1	2
1	-	1. <b>.61&lt;0.05</b> 2. 0.67>0.05 3. 0.73>0.05 4. <b>4.27&lt;0.001</b>
2	-	-

1 –body length; 2 –body mass; 3 –systolic BP; 4 –diastolic BP.

Countryside schoolchildren, in respect to their peers from urban schools, had higher indicators of systolic BP by 1,9 mm.merc.col. ( $t=0.73$ ;  $p>0.05$ ) and diastolic BP – by 5.4 mm.merc.col. ( $t=4.27$ ;  $p<0.001$ ). The received data of heart beats rate, vital capacity of lungs, head circumference and chest circumference were the same in both groups ( $p>0.05$ ).

At the end of the research individual features of urban and countryside boys manifested in different way. For example, body length of urban boys, in respect to their countryside peers, was higher by 2.7 cm ( $t=2.06$ ;  $p<0.05$ ); body mass – by 1 kg ( $t=0.83$ ;  $p>0.05$ ); VCL – by 260.8 ml ( $t=1.09$ ;  $p>0.05$ ); chest circumference – by 1.2 cm ( $t=1.47$ ;  $p>0.05$ ). We registered among them values of systolic BP less by 2.3 mm.merc.col. ( $t=0.73$ ;  $p>0.05$ ); and diastolic BP – by 4.9 mm.merc.col. ( $t=4.22$ ;  $p<0.001$ ) (see table 5).

Table 5  
Matrix of statistic confidence of morphological-functional indicators of 11-12 yrs age boys from urban and countryside schools at the end of academic year ( $n=50$ )

Groups	1	2
1	-	1. <b>2.06&lt;0.05</b> 2. 0.83>0.05 3. 0.73>0.05 4. <b>4.22&lt;0.001</b>
2	-	-

At the beginning of the research we carried out questioning for determination of school anxiety by Phillips. 21% of answers showed fear of not to correspond to expectations of their peers by actions and thoughts. 10% showed general negative background of relations with adult. 17% - expressed heavy emotions towards peers. 11% - fear of self expression in eyes of surrounding people. 9% showed unfavorable mental state and fear of checking their knowledge. 8% had destructive response to anxiety of environment. 6% of answers showed general anxiety of urban schoolchildren (see fig.1).

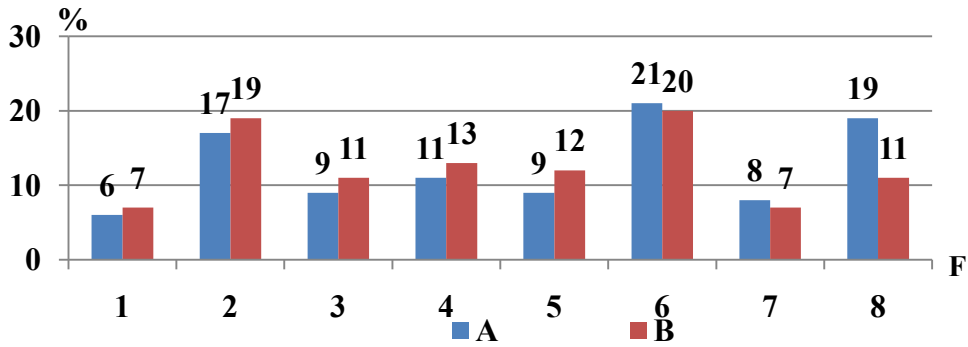


Fig.1. Factors of school anxiety of 11012 yrs age boys of urban schools (n=25): F – factors; A – at the beginning; B – at the end;

At the end of academic year indicator of fear of checking knowledge increased by 3 %; feeling of social stress – by 2 %, as well as fear of high results’ achievement and fear of self expression; general school anxiety – by 1 %. Indicator of fear of communication with teachers reduced by 8 % and fear of possible inadequate peers’ response – by 1 % (see fig. 1).

At that time countryside boys had the following most expressed factors of school anxiety:

на початку:

- 21 % - opinion of surrounding people,
- 18 % - frustration, connected with demand in success,
- 15 % - anxiety, connected with school life,
- 12 % - checking of potentials,
- 11 % - fear of self expression,
- 8 % - contacts with peers, low physiological resistance,
- 7 % - problems with teachers.

At the end:

- 24 % - anxiety connected with opinion of surrounding people,
- 23 % - frustration, connected with demand in success,
- 13 % anxiety, connected with school life,
- 12 % - checking of potentials,
- 9 % - fear of self expression,
- 6 % - contacts with peers, problems with teachers (see fig.2).

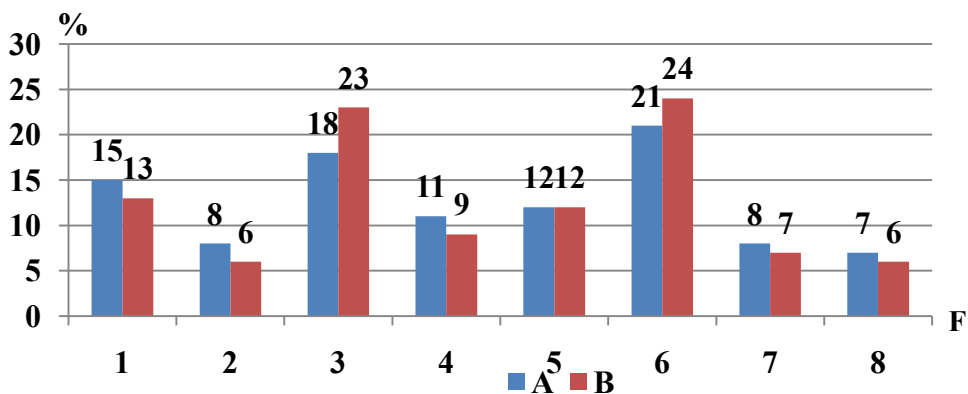
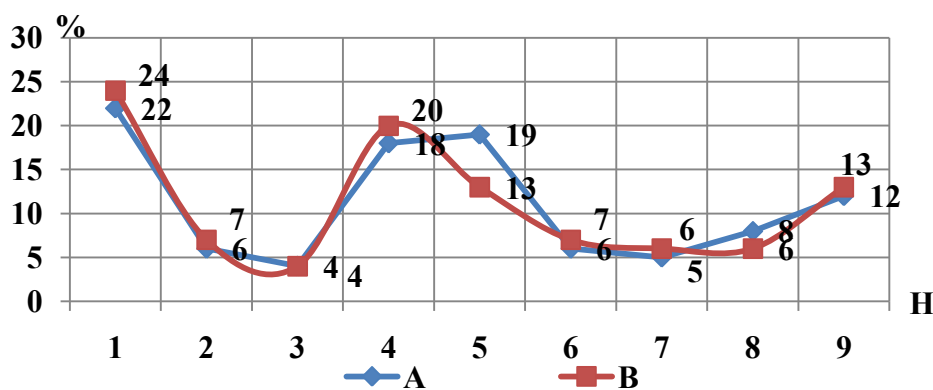


Fig.2. Factors of school anxiety of 11012 yrs age boys of countryside schools (n=25): F – factors; A – at the beginning; B – at the end;

At the beginning and at the end of the research there were registered the following diseases among urban boys (as per medical records):

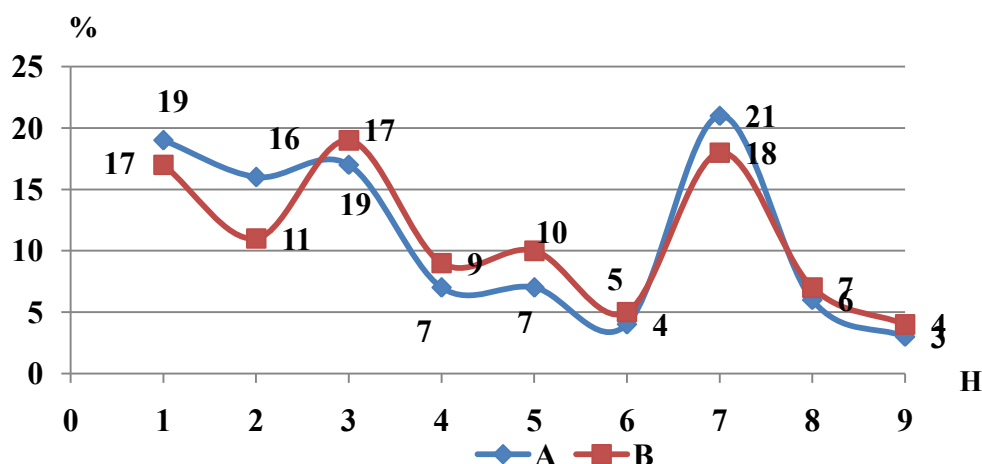
- 22-24 % - intestinal and virus infections,
- 19 % - respiratory infections, influenza, pneumonia, bronchitis,
- 18-20 % - disorders of nervous system,
- 12 % - infectious arthropathy
- 8 % - traumas, intoxications (see fig.3).



1 – infectious and parasitic diseases; 2 – blood and blood generating organs’ diseases, some disorders in immune mechanism; 3 – diseases of ears; 4 – diseases of nervous system; 5 – respiratory system’s diseases; 6 – diseases of digestion organs; 7 – diseases of urogenital system; 8 – traumas, intoxication and their after effects; 9 – diseases of bone-muscular system.

Fig.3. Diseases of 11-12 yrs age boys of special health group (countryside schools) during period of research (n=25): H –diseases; A –at the beginning; B –at the end.

Indicators of special health groups’ countryside boys were significantly different. There were more infectious diseases: of ears (17-19 %), urogenital system (18-21 %), immune system (11-16 %), respiratory system (7-10 %), nervous system (7-9 %) (see fig. 4).



1 – infectious and parasitic diseases; 2 – blood and blood generating organs’ diseases, some disorders in immune mechanism; 3 – diseases of ears; 4 – diseases of nervous system; 5 – respiratory system’s diseases; 6 – diseases of digestion organs; 7 – diseases of urogenital system; 8 – traumas, intoxication and their after effects; 9 – diseases of bone-muscular system.

Fig.4. Diseases of 11-12 yrs age boys of special health group (urban schools) during period of research (n=25): H – diseases; A –at the beginning; B –at the end.

In connection with individual diseases of 11-12 yrs age of special health group we determined low level of physical culture classes’ attendance in respect to other subjects, For example we registered only 53 % of PC classes’ attending in urban schools and 48 %; in countryside schools (82 % – 76 % accordingly) (see fig.5).

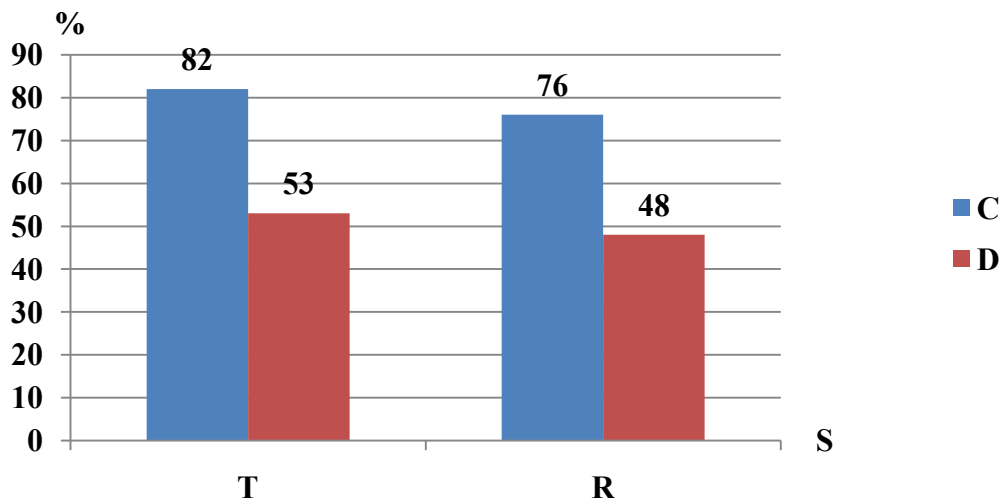


Fig. 5. Attendance of PC classes by 11-12 yrs age boys in urban and countryside schools in respect to other subjects ( $n_1=25$ ;  $n_2=25$ ): S – schools, T –urban, R – countryside, R – other subjects, R – Physical culture.

Against the background of social economical changes, school physical culture is in crisis, especially in countryside. For academic year health of children and adolescents significantly reduces, great quantity of physical culture classes is missed, quality of physical culture conduct does not motivate adolescents for physical culture and sports practicing. In this connection provisioning of harmonious development and health protection of children, both in urban and countryside schools, is of main priority in sphere of physical education.

#### Discussion

In course of our work we received three groups of data.

First group includes results, received *for the first time*:

- We found dependence of PC classes' attendance by 11-12 yrs age boys of special health groups (in urban and countryside schools) and level of morphological-functional indicators;
- We registered different diseases and factors of school anxiety of 11-12 yrs age boys of special health groups (in urban and countryside schools) in puberty period.

The second group data *supplement* the first group:

- I.P. Aistova (1995); L.V. Baiborodova (2002); V.K. Balsevych (1995); S.G. Bronevshuk (1997); K.P. Dorozhnova (1983) (data, connected with physical culture and social level of population.
- Ye.V. Bykova (2000), M.A. Vinichenko (2003), T.S. Kuposova (2000): changes of anthropometrical and functional indicators of boys of puberty age;
- L.S. Vygodskiy (1991), I.S. Kon (1989), A.V. Libina (2004), V.S. Mukhina (1999): psychological factors in puberty period.

The third group includes results, *which prove* scientific data of advanced scientists (I.A. Arshavskiy 1981; Jh. Vader, 1991; L.V. Volkov, 2002; A.A. Guzhalovskiy, 1984, 1986; T.Yu. Krutsevych, 1985, 1999, 2000) – they say that it is necessary to consider teenager's individual health in process of physical education.

In pedagogic testing we obtained different data about morphological-functional indicators, factors of school anxiety and individual diseases of urban and countryside boys of 11-12 yrs age. These data will help to correct and fix in short term level of functional systems when composing health related physical culture programs for special health groups.

Practicing of health related physical culture measures among pupils with health disorders shall be started in domestic conditions. Then they should be stimulated at physical culture lessons and after lessons at school. Such approaches permit to develop harmoniously and prevent from diseases' progressing.

#### Conclusions

1. During academic year we determined difference between morphological functional indicators of 11-12 yrs age boys of urban and countryside schools' special health groups in body length ( $t=2.61$ ;  $t=2.06$ ;  $p<0.05$ ), diastolic BP ( $t=4.27$ ;  $t=4.22$ ;  $p<0.001$ ). It witnesses about demand in support of countryside boys in physical education.

2. We found that among *boys of urban schools* the following factors of school anxiety dominate:

- Fear of not corresponding to expectations in actions and thoughts;
- General negative background of relations with adults;
- Feeling of emotional state with peers;
- Fear of self expression in eyes of other people;
- Unfavorable mental state and fear of checking knowledge;
- Destructive response to disturbing factors of environment;

- General anxiety at school;  
Among *boys of countryside schools* the following factors of school anxiety dominate:
- Anxiety of opinion of surrounding people;
- Frustration in respect to achievement of success;
- Anxiety, connected with school life;
- Fear of checking of potentials;
- Fear of self expression;
- Fear of contacts with peers;
- Low physiological resistance.

3. It is necessary to work out new methodic approaches to physical culture at schools (especially for special health groups), which would orient on training of motor skills, giving theoretical knowledge, formation of schoolchildren's stimulus for physical culture functioning, cultivation of their demands in physical self perfection.

*The prospects of further researches* imply determination of motor skills of 11-12 yrs age boys of urban and countryside schools' special health groups.

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#### Conflict of interest

Author declares that there are no conflict of interests.

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**Information about the author:**

**Tamozhanskaya G.V.:** <http://orcid.org/0000-0003-2430-8467>;  
kulichka79@ukr.net; Kharkov State Academy of Physical Culture;  
Klochkovskaya str. 99, Kharkov, 61022, Ukraine.

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