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Research article

DIFFERENCES IN INDICATORS OF POSTURAL STATUS BETWEEN BOYS AND GIRLS FROM SREM

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Abstract

Improper seating, various forms of activities as well as certain endogenous and exogenous factors negatively affecting on postural status and does not lead to any body improvements. A healthy and good posture is the basic form for properly constructed mechanics and the assumption of good statics and dynamics of whole body. Postural status was evaluated on the sample of 833 children, aged 4-13, from the population of Preschool institution and Elementary School in Municipality of Ruma, Stara Pazova, Sremska Mitrovica and Indjija. Two anthropometric measures and CONTEMPLAS 3D system for evaluation postural status were applied. Parameters of postural status and trend were analysed wit basic descriptive statistics ANOVA and MANOVA. Result show that almost 30% of all children have bad posture and there is a high number of those with weaker body segments. Boys have better posture status than girls especially in legs deformity.

Keywords: Posture, Contemplas, Children, Gender differences

Introduction

Improper seating, various forms of activities as well as certain endogenous and exogenous factors negatively affecting on postural status and does not lead to any body improvements. A healthy and good posture represents a base for properly constructed mechanics and the assumption of good statics and dynamics of the whole body. To adapt good posture in early childhood contributes to proper development, and as a result it affects overall health and quality of life. Creating a proper posture status is of particular importance in pre-development period and the early years of school period (Sabo, 2003). Most authors consider that the posture of the good status depends on the health status of individuals. Disturbing the biomechanics and postural status leads to changes in muscle, skeletal system, as well as in psychological and social status. Along with certain health problems, aches and pains, causes of formation postural disorders among children are different: obesity (Milosevic et al., 2007a, Milosevic et al., 2007b), malnutrition (Protic-Gava, 2008), insuf-

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ficient physical activity (Sallis, 2000). Such a trend in the later development of the body and life can be a serious problem. An extremely important factor and element in the process of growth and development is certainly physical activity. Many previous studies have talked about it in the direction of development of the entire musculoskeletal system of the body. Lack of movement leads to a disorder and that is associated with the posture status. Modern way of life and living restrictions reduce movements witch reflected to some problem in postural status. Hypokinesis and lack of exercise has consequences in terms of low activation of muscles, decreased activity of the whole body and the occurrence of deformities.

These factors certainly accelerate process and condition for develop many problems with postural status and body mechanics. One particular part of the deformity and disorder is definitely determined by genetic but the trend of increasing the number of postural disorders which are associated with other factors. Thus, different endogenous and exogenous elements can act and create an unfavourable presumption of continuing develop of deformity of different body segments. However, active movement has the most important role in the formation and maintenance of proper body posture. The weakness of certain muscle groups, and their excessive workloads, can cause a variety of disorders of the spine, thorax, upper or lower extremities, especially the feet. Extremely bad habits and conditions lead to inactivity of different muscle group and inadequate behavior segments in these conditions may in addition develop deformities and disorders. The prevalence of these disorders occurs particularly among school age children. Researches show that occurrences of deformities and bad postural status have negative trends (Sabo, 2003; Slavnić et al., 2005).

Many studies showed that the flat-foot represents the most common disorder of the lower extremities especially in early childhood (Mihajlovic, Tončev and Hmjelovjec, 2008; Trajkovic and Nikolic, 2008; Protic - Gava and Krneta, 2010). Such an occurrence is characterized by the loosening and weakening of the arch of the foot, leading to the loss of its physiological and functional properties. (Jovović, 1999, Jovovich and Čanjak, 2012). Zivkovic and Milenkovic (1994) examined the state of postural disorders and the results show the highest percentage in spine and feet deformity. Researches of postural status among preschool children in Novi Sad show that the largest deviations occur in holding back, shoulders, abdomen, also boys had better posture of the head and abdomen than girls (Sabo, 2003; Toth, 2001). From these studies it can be seen that the disturbances is in really high percentage and that their appearance becomes increasingly widespread, especially among children of pre-school age and also in early school period.

Method

The survey was conducted with a sample of 833 children, between the ages of 4 and 13. All children attend either Kindergarten or Elementary School and come from the Municipality of Ruma, Stara Pazova, Sremska Mitrovica and Indjija.

Measuring instruments used in this study were evaluating anthropometric and postural status. Anthropometric measures were assessed according to the method of the International Biological Program (IBP) (Lohman, Roche, & Martorell, 1988). The sample of anthropometric measures included (Bala, 1981):

1. Body height (mm)
2. Body weight (0.1 kg)

Contemplas and 3D compact protocol analysis were used in assessing postural state.

1. Cervica spine (C7)
2. Sacrum
3. Acromion left
4. Trochanter major left
5. Acromion right
6. Trochanter major right
7. Thoracic spine (kyphosis)
8. Condylus left
9. Lumbar spine (lordosis)
10. Condylus right
11. ISG left
12. Maleolus lateralis left
13. ISG right
14. Maleolus lateralis right

Based on the marked points we get the value in:

1. Position of the shoulders in the frontal plan;
2. Position of the pelvic in the frontal plan:
3. Posture in the sagittal plane
4. Position of the legs

The collected data was analysed through basic descriptive statistics means, Standard Deviation, Minimum, Maximum, Skewness and Kurtosis. The analysis was carried out separately according to different gender. Manova and Anova were used to determinate differences between gender in all system of variables and also separately by every variable. Statistical analysis was performed using the SPSS 20.0 statistical package.

Results

In the table we can see values of most of the observed parameters of postural status. Approximately one third of respondents have a bad posture, and there id a high number of those with weaker body segments.

Table 1. Descriptive statistics

		N	Min	Max	AS	SD
	Age	431	4,53	13,72	7,452	2,023
Boys	Body high	430	103,50	160,60	127,526	13,169
	Body weight	430	14,70	59,70	28,220	9,273
	Age	405	3,95	11,88	7,658	2,069
Girls	Body high	406	103,10	166,40	128,628	13,802
	Body weight	406	14,80	58,80	28,664	9,063

Legend: N - Number of respondents; Min - Minimum; Max - Maximum; AS - Mean; SD -Standard Deviation.

The results presented in Table 1 show the parameters of anthropometric characteristics and distribution in each group of respondents

Table 2. Manova and Anova according to a gender

Variable	Gender	N	AS	SD	f	Sig.
Shoulder displacement	Boys	437	,1385	,913	,001	,971
	Girls	407	,1407	,850		
Pelvic obliquity	Boys	437	,0264	,340	,093	,761
	Girls	407	,0196	,306		
Shoulder obliquity	Boys	437	-,2279	4,798	,563	,453
	Girls	407	-,4715	4,620		
Distance cervical spine - sacrum	Boys	437	1,8387	2,121	,134	,715
	Girls	407	1,7862	2,041		
Distance thoracic spine - sacrum	Boys	437	-1,3736	1,614	6,971	**,008**
	Girls	407	-1,0767	1,651		
Distance lumbar spine - sacrum	Boys	437	1,5118	1,019	60,034	**,000**
	Girls	407	2,0716	1,079		
Varus/Valgus left	Boys	437	,4926	2,731	39,957	**,000**
	Girls	407	1,6551	2,601		
Varus/Valgus right	Boys	437	,8554	2,759	23,740	**,000**
	Girls	407	1,7667	2,666		
Cervical spine	Boys	437	-,1947	,942	,000	,991
	Girls	407	-,1939	,861		
Thoracic spine	Boys	437	-,3957	,717	,188	,665
	Girls	407	-,4171	,712		
Lumbar spine	Boys	437	-,1606	,318	,017	,898
	Girls	407	-,1636	,349		
					F	Sig.
					9,701	**,000**

Legend: N- Number of respondents; AS- Mean; SD- Standard Deviation; F- value of f test; Sig- Statistical signification on level of p≤0, 05

By determining the difference between boys and girls on the whole sample variable, trying to contribute to establishing the space in the relationship between gender and the characteristics of postural status between them. Table 2 shows the results of multivariate analysis of variance, which showed that there is a statistically significant difference between the two groups. When evaluating individual we can see that the differences do not occur in all variables. Specifically, the variables Distance thoracic spine - sacrum, lumbar spine Distance - sacrum, Varus / Valgus and Varus left / right Valgus show significant differences among each other. There is no significant difference between boys and girls when other variables are referred to. Univariate analysis of variance and F-test value may indicate that the greatest difference noticed in the variables Distance lumbar spine - sacrum and Varus / Valgus left. Moreover, it is evident that the distribution of the standard deviation does not show large deviations from the normal distribution of values in both male and

female samples. Accordingly, it may be said that the sample belongs to the normal distribution in the population.

Discussion

photometric method was applied in this research in order to assess postural status of subjects of both genders aged 4 to 13 using the system for postural analysis of 3D body with the TEMPLO software. The great importance of this work lies in the fact that we are able to observe the development of posture during this very important and tumultuous development period of children. It gives us the ability to better identify their needs. We get the opportunity to make adequately and efficiently programmed preventive system of physical exercise.

Research results that the boys and girls significantly distinguish in postural status. It is evident also that boys have a better segmental parameter and thus better postural status at a general level. Individually, the difference is greatest in the area of leg deformities as well as in distance of vertebrae in the frontal plane. Stronger muscles and better posture boys in this period may be the reason for these results. The girls have a higher degree of deformity of the legs as varus and valgus shape of legs. The bad status of spinal column in frontal plane show that scoliosis as a phenomenon more common in girls, and that such deformities result of weak muscles, especially in lower back.

Modern diagnostic postural status with Contemplas equipment provides precise and efficient detection of posture status. From result in the large number of respondents overall findings suggest that proper growth and development of children and youth depend on many factors, but primarily on the active involvement of parents. Therefore, it is necessary to let the kids run free, jump, to climb, crawl, which can be achieved by involving children in active life, sport, gymnastics but also in other forms of exercise. Children timely brought into the daily programming, and strictly controlled physical activity aimed at improving posture status. With fining of this research parents should pay more attention to the segments of the spine and legs as.

The lifestyle of parents and children causes a lack of movement so the children must spend less time at the computer and more time in a variety of physical activities: cycling, swimming training, training skating, roller skating, long walks. Along with that, with diagnostics of postural status it is possible to prevent it, and encourage the proper growth and development. That form should be created to help parents, physical education teachers, coaches, physicians and children.

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