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OVERVIEW OF THE CURRENT RESEARCH ABOUT ANTROPOLOGICAL SPACE OF MALE AND FEMALE YOUNG SCHOLARS



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ABSTRACT

The study was conducted in order to carry out the analysis of previous studies related to anthropological space of early school age children, and to present them on the basis of certain conclusions about the gender difference related to the motor capabilities, morphological dimension and functional abilities. The empirical method of work has been used for the quality realization of the research. Based on a survey of the research by domestic and foreign authors, it can be concluded that full differences are evident in all ages (from 7 to 15 years of age), that they are full of gendered dimorphic differences in morphological dimensions, that motor skills develop in general - the existence of a general motor factor. Changes in the functional abilities of children are possible under the influence of different training loads and programs of work of different time duration.

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Key words: morphological characteristics, motor skills, functional abilities, children.

INTRODUCTION

For the development of child physical motor skills, the basic importance is age and learning of certain motor activities, skills, while the most important principles of motor development are: cefalokaudal and proximodistal direction; tendency of development from a general mode of reaction in a specific way; the tendency of increasing use of small muscles; a tendency for the transition from a two-sided use of the limbs to one-sided; Increased economy in the work of muscles. In the younger school age, a lot of things can influence the formation of motor behavior of children and the learning of specific motor activities. This behavior depends on many factors (genetics, lifestyle, etc.) and, among other things, their anthropological characteristics. The period of the younger school age could be the basis for the later formation and development of specific motor skills and for actively engaging in some sport or for creating a habit of sports recreation at a later age. Motor skills are expressed in such a way that one ability compensates for the other, so the child exhibits his complex motor skills in various situations and tasks. Regardless of the fact that motor skills, during the younger school age, are not fully defined yet, this period is very important in the development of this basic (general) motor skills. Practically it seems that children with their overall motor knowledge realize the realization of motorized tasks. Therefore, many experiences speak in favor of the fact that physical exercise in the period from 7 to 11 years of age should be based on the formation of the best base, that is, the practical preparation of the best possible basis for the later improvement of specific motor skills. Difficulties in correctly determining the motor status of a child in the observed period is that when performing motor tests, isolated individual motor



abilities are not exhibited in adults, and it is very difficult to determine for which of their motor skills they serve. Different motor tests in different ages evaluate different motor skills. For example: the adult long jump test estimates the explosive force, while the testing of children is considered to be evaluating the coordination. Also, as a second example, a case with a motor test can be observed by tapping the hand, which estimates the frequency of arm movement in adults. It seems that using this motor test in children can assess their coordination abilities²³. The mechanism for structuring the movement can also be called the general coordination factor. According to this, among other things, it depends on the speed at which persons can form their own motor programs, i.e. by which speeds can be adopted new movements³².

METHODOLOGY OF RESEARCH

A descriptive method, supported by theoretical analysis and generalization, was used to produce the work. This method was used because it implies equal treatment of empirical and theoretical research, i.e. Inductive and deductive approach to conclusion. Primary and secondary sources, domestic and foreign, professional and scientific literature, expert papers, search of internet domains and electronic journals were merged. Exploring for research was conducted by domestic and foreign authors and it was carried out by using Kobson, Google Scholar and Pubmed. The magazines were examined in the field of sports science for sports medicine and physical fitness. Search is limited to studies that have been conducted over the last 30 years, and as keywords have been used: morphological characteristics, motor skills, functional abilities and younger school age. In the field of the listed fields, 38 original scientific papers have been identified.

RESULTS

The correct approach to each research implies the previous setting of a theoretical model of research based on previous experience in studying the current subject of research. Anthropological space is multidimensional, interactive, and therefore the author of this work has decided to separately analyze the theoretical models of relevant subspaces. In order to get a clearer picture of the anthropological area of the younger scholar children, the survey included an overview of the previous studies related to motor skills, morphological characteristics, functional abilities and cognitive abilities.

Motor skills

Physical development and physical abilities are very important multidimensional terms whose definition and selection of appropriate parameters has a long and complex history. The problem of monitoring and evaluating various variables in this field requires the scientific establishment of the overall system structure and the definition of those dimensions that mark this structure as an

organized whole, since the results in the field of physical training are negligible if control and monitoring of these processes is not carried out, with the objective valorization of their effects. In the process of programming and implementation of the system for monitoring the morphological and motoric abilities of children and youth, it is necessary to determine the level, dynamics and structure of current events related to gender, age, social, ethnographic, geographical and other characteristics. Determining the structure of the entire motor space or the structures of only some or some segments of the motor space and the relationships between different segments of the motor space are some of the kinesiologists who are interested in. An overview of the previous research by domestic and foreign authors regarding the full dimorphic differences in motor skills for children of the younger school age are presented in Table 1.

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Table 1. Gender differences in motor skills

| Study | Age | Gender | N | Differences |
|---|------|--------|---------------------------|--|
| Bala (1981) ³ | 6-10 | M / F | / | Existence of hypothetical motor dimensions has not been confirmed-the existence of a general motor factor has been established. |
| Moravec and Sedlaček (1993) ²⁵ | 7-9 | M / F | 10 713 men, 10 979 girls | Coordination and balance is better for girls, the strength bigger in boys |
| Katić et al. (1994) ¹⁷ | 7 | F | 123 | The general factor of motor skills is defined by strength and coordination |
| Bala et al. (1996) ⁴ | 7-11 | M / F | / | The structure of the motor space on the basis of genetic and external factors that influences the overall growth and development of children is being constructed. |
| Petković (1999) ²⁸ | 7-10 | M / F | / | Speed, coordination, differentiation of strength topography, static endurance. |
| Kondrić et al.(2002) ¹⁹ | 7-9 | M / F | 564 | Power, coordination, boys better in speed, more flexibility in girls |
| Katić et al. (2004) ¹⁸ | 7-11 | F | 2235/4 ages | Changes in motor behavior related to age (speed, strength). |
| Kukolj et al. (2006) ²¹ | 7-11 | M / F | 978 | Frequency of movement, strength, coordination and agility in favour of boys. |
| Badža (2007) ² | 7-9 | M / F | 128 | Running speed and strength in the favour of boys, flexibility in favour of girls. |
| Krsmanović and Radosav (2008) ²⁰ | 9-11 | M / F | 266 | Speed, coordination, static arm strength and explosive leg power in favour of boys, flexibility in favour of girls. |
| Williams et al (2008) ³⁷ | 7-10 | M / F | 118 | Moderate physical activity has a positive effect on improving motor skills and overall motor functionality. |
| Kalentić et | 7-8 | M / F | 311 - 166 boys, 145 girls | Coordination in favour of boys. |



| | | | | |
|---|-------|-------|----------------------------|--|
| al. (2009) ¹⁵ | | | | |
| Matić, Kuljić, Maksimović (2009) ²⁴ | 7-11 | M / F | 190 boys, 171 girls | Physical activity, and therefore the development of motor skills of girls, is more determined by the influence of socio-economic factors than in boys. |
| Matić and Jakšić (2010) ²³ | 7-11 | F | 338 | More favorable socio-economic conditions allow better development of individual motor skills (frequency of movement and body lifting). |
| Sabolc and Lepes (2012) ³⁰ | 7 | M / F | 125 - 62 boys and 63 girls | Boys dominate in speed, coordination, and explosiveness, and girls in the flexibility |
| Carlos (2013) ⁸ | 10-11 | M / F | 312 - 152 boys, 160 girls | Increased strenght, speed and endurance in boys are expressed, and girls dominate in balance and flexibility. |
| Pelemiš, V. , Pelemiš, M. and Mitrović (2014) ²⁷ | 10/11 | M / F | 33 boys, 33 girls | Differences exist in the space of static and explosive forces in favor of boys, balance and flexibility in favour of girls. |

The younger school age as a whole is a very sensitive period for the development of children's motoring, and especially when it comes to learning and adopting a comprehensive motor skills repertoire³⁶. It is very important not to miss this period, that is, the advantages it brings in the formation of the motor fundament. For the development of a child in this, even in the younger age, a selection of suitable movement activities is of great importance. The child, through movement and motion, explores his possibilities, introduces himself and his environment, communicates with others.

Morphological characteristics

Morphological characteristics represent the primary information on the psychosomatic status of a man determining the system of basic anthropometric latent dimensions, whether these dimensions are developed under the special influence of the outside environment (eg training) or not. Morphological characteristics differ due to gender and age, as well as genetic and ecosocial factors. Therefore, the results of anthropometric variables of other populations can not be used to evaluate this structure of our population. Also, given the accelerated phenomena and the relatively rapid changes in the ecosocial conditions of the research within this area, it should be repeated periodically, because the results are very quickly outdated. Analyzes of the results performed on the population measured by the longitudinal method would probably more realistically reflect the structure of this space, especially within the school age population, where morphological and other changes take place in a very dynamic, sometimes burgeoning way, as is the case in the ripening period. However,

the reasons of material nature and some other practical reasons most often dictate the methods of measuring the population by the transverse cross sectional method. Table 2 shows a survey of research related to the morphological dimensions of children of the younger school age. Research, which, according to the author of the paper, is the most important in terms of defining morphological dimensions and gender differences. It should be emphasized that differences were evident at every age, which is a consequence of the growth and development of the organism, and the fact that the biological and chronological age of children does not fully coincide. The girls mature earlier, and the longitudinal dimensionality was more pronounced as they were older (for example, female students of the 4th grade were much bigger than boys of the same age in terms of longitudinal skeletons).

Table 2. Gender differences in morphological characteristics

| Study | Age | Gender | N | Differences |
|--|------|--------|----------------------------|--|
| Bala (1981) ³ | 6-10 | M / F | / | Dimensionality of the skeleton, volume of the body, subcutaneous adipose tissue. |
| Božić-Krstić Rakić and Pavlica (2003) ⁷ | 7-18 | M / F | 1269 boys, 1212 girls | Body height and weight are differentiated in different age. |
| Katić et al. (2004) ¹⁸ | 7-11 | F | 2235 | Depending on age, the morphological appearance of girls changes. |
| Kukolj et al. (2006) ²¹ | 7-11 | M / F | / | Body height, body weight between different age. |
| Bigović (2006) ⁶ | 11 | M / F | / | Body height and length of leg in favor of girls. |
| Bavčević et al. (2006) ⁵ | 7 | M / F | 608 - 294 girls , 314 boys | Differences in the latent morphological structure in the longitudinal dimension of the skeleton in favor of girls. |
| Popović (2008) ²⁹ | 4-11 | M / F | 1242 boys, 1082 girls | Trend of increasing body height, body weight, body volume with age of examinee |
| Gojković (2008) ¹² | 11 | M / F | 212 | Intense changes happen in morphological space during one school year. |
| Kalentić et al. (2009) ¹⁵ | 7/8 | M / F | 311 – 166 boys, 145 girls | Girs have more skin folds. |

Functional abilities

Since today's children of the younger school age are less interested in the authentic need for movement, the question of the decline of their anthropological characteristics and abilities is imposed, and the decline in these abilities affects their health and the level of functional abilities. The onset of obesity at that age will certainly not have a beneficial impact on their health but will affect the poor condition of all

anthropological characteristics, as well as the decline in functional and motor skills. It is necessary to perform an assessment of aerobic abilities that are directly related to the activity of the child and the state of functional abilities. The greatest increase in aerobic capacity can be expected in children only after the intensive growth phase. It is then recommended to develop this ability among athletes. Of course, the progress in aerobic abilities during the period of growth and development of the child can increase, but it is still recommended that the training for the development of this ability be applied only after the stage of intense changes of children (14-16 years of age). Table 3 presents an overview of the previous research related to the functional capacity of children of the younger school age.

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Table 3. Functional abilities of children of the younger school age

| Study | Age | Gender | N | Ascertainment |
|---|-------|--------|---------------------------|--|
| Tamiya (1991) ³⁵ | 6-15 | M / F | 112 | Aerobic abilities are less than in adults. |
| Harrell et al (1996) ¹³ | 8-9 | M / F | 1274 | Low level of functional abilities directly affects the occurrence of cardio-respiratory diseases of children |
| Mandigout et al (2002) ²² | 10-11 | M | 19 | Thirteen week endurance programs lead to changes in the maximum consumption of oxygen |
| Katić et al. (2004) ¹⁸ | 7-11 | M / F | 2235 | The development of motor skills depends on the development of functional abilities. Aerobic abilities are more intensively developed in girls of the older age |
| Vinet et al (2005) ³⁹ | 11-12 | M | 20 | Intensive training does not cause heart failure, no harmful effects |
| Aleksic, Kocic, Tosic (2009) ¹ | 9-10 | F | 99 | The effects of the program of rhythmic gymnastics contribute to positive changes in functional abilities |
| Gamelin et al (2009) ¹¹ | 9-12 | M / F | 38 | Seven weeks of high intermittent training can improve the aerobic ability of children |
| Pejcic, Trajkovski-Visic and Malacko (2009) ²⁶ | 4-7 | M / F | / | Functional abilities are directly related to the activity of the child |
| D Honde, et al (2009) ¹⁰ | 5-10 | M / F | 117 | Overall level of motor skills is lower in obese children compared to children of normal nutrition |
| Savic et al. (2010) ³¹ | 7-14 | M | 240 | Functional abilities are more developed for people involved in the football school program than the non-sports population. |
| Karaleic et al. (2011) ¹⁶ | 12-13 | M | 115 | The level of explosive power depends on the level of energy processes. |
| Carlos (2013) ⁸ | 10-11 | M / F | 312 - 152 boys, 160 girls | Higher aerobic capacity is found in boys. |
| Carlos et al (2014) ⁹ | 10-11 | M / F | 125 – 58 boys, 67 girls | Intensive training processes can affect functional ability changes of aerobic capacity equally among boys and girls. |



DISCUSSION

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Changing the results in motor activities in children of the younger school age, regardless of gender always occurs in accordance with certain changes in the muscular, bone and joint systems and other systems, which can significantly facilitate or impede the realization of appropriate motoristic tasks. These changes in motor skills take place in the current socio-economic conditions that are characteristic of the environment of an individual or group of people and represent a set of cultural, material, urban and other factors. Therefore, the results of these changes are not only biological and physiological, but can also be the consequence of different socio-cultural conditions, knowledge and circumstances characteristic of the given environment. Due to the stated characteristics of expressing motor skills and the specific characteristics of expressing the motor skills of children of the younger school age, it happens in accordance with the morphological characteristics of a particular period of growth, intellect and social factors of the environment. The influence of social factors on participation in the physical activity of the child can be strongly expressed during the younger school age. This is confirmed by studies that deal with factors that influence the participation of children in physical activity in relation to the weaker and better socio-economic status of the environment in which it is taking place²⁴. The use of biological potentials is very different, given the different environmental impacts of the most intense growth and development phases. The social standard, the cultural level of the environment, the place and the role of physical education in it are just some of the factors of the social environment that can, by their indirect action, focus on the development of motor skills, morphological characteristics, and the development of cognitive abilities and conative characteristics of its members. Considering that during the growth and development of motor skills and morphological characteristics, it is necessary to monitor them at different ages. According to some authors, predicting the potential range of young athletes on the basis of somatic (physical) indicators becomes safe after the end of the younger school age, approximately at the age of 12. Also, after the completion of the younger school age (from 7-11 years), in which the development of motor skills is still of general character, there is an explosion and differentiation of motor skills, which, along with morphological dimensions, are certainly the most important factors for the proper selection in the selection of young athletes. Bearing in mind the anthropological space of children of the younger school age in certain age periods, it can be concluded that the younger school age marks the beginning of active engagement in sports activities, while the period of selection of sports activities and shaping of the athlete coincides with the differentiation of motor skills and possibilities of forecasting the potential range in accordance with somatic indicators. The tendency of reducing the physical activity of children directly affects the level of motor skills, which happens not only in our country, but also in neighbor countries^{34,33} as well as in the developed countries^{14,36,38}. Functional abilities are less than in adults, the development of strength does not impair the manifestation of



explosive force. The differences between the gender in the favour of boys and in the favour of more active groups of respondents were noted. Training processes contribute to the improvement of the functional capacity of children of the younger school age. In general, it can be noted that gender differences in the anthropological space of younger schoolchildren are evident in all ages and that they are more differentiated by the trend of growth than motor skills.

CONCLUSION

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The results of this extensive research confirm the regularity of the applied methods. They also emphasize the importance of the obtained research results and point to the possibility of further research work on the same problem. In this way, the quality of research is raised. It can be concluded that in most studies is found statistically significant differences in morphological characteristics and motor abilities of children aged 7 years of different gender. Training processes improve functional abilities. However, for a more serious analysis, many more research would be required, in which a much larger number of variables would be included with the same performance protocol, and then the results would have been more valuable. Having examined all aspects of the anthropological space of children of the younger school age, a review of professional literature, a wide array of research, problems and objectives of research, subjects of work, scientists from European countries, the Far East and the United States are noted. Research, which tracks changes under the influence of exercise processes, is increasingly reflected in the level of functional abilities that take place under the direct influence of growth and development of the organism. They are connected to the changes in functional and motor skills in different age periods in subjects of different gender and years of life.

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| | The authors declare that they have no financial, consulting, and personal relationships with other people or organizations that could influence the author's work. |
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