СЪВРЕМЕННИ ТЕНДЕНЦИИ НА ФИЗИЧЕСКОТО ВЪЗПИТАНИЕ И СПОРТА

Направления:

1. *Физическото възпитание, спортът и рекреацията в образователната система*
2. *Рекреация, анимация и спорт в свободното време – превенция за здраве*
3. *Теория и методика на физическото възпитание и спорта*
4. *Връзка на физическото възпитание и спорта с други дейности и научни области*

СЕДМА
МЕЖДУНАРОДНА
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СЪВРЕМЕННИ ТЕНДЕНЦИИ НА ФИЗИЧЕСКОТО ВЪЗПИТАНИЕ И СПОРТА

Софийски университет „Св. Климент Охридски“
Департамент по спорт
Университетско издателство „Св. Климент Охридски“
София, 2015

85 години спортна дейност в Алма Матер

Съставител
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ISSN 1314–2275

ФИЗИЧЕСКОТО ВЪЗПИТАНИЕ, СПОРТЪТ И РЕКРЕАЦИЯТА В ОБРАЗОВАТЕЛНАТА СИСТЕМА

РАЗЛИКИ В ПОСТИЖЕНИЯ НА ТЕСТОВЕ ЗА ПРЕЦИЗНОСТ ПРИЛОЖЕНИ НА ДЕЦА В НАЧАЛНИЯ УЧИЛИЩЕН ПЕРИОД

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BILJANA POPESK, DESPINA SIVEVSKA. DIFFERENCES IN ACHIVEMENTS AT TESTS FOR PRECISENESS APPLIED WITH CHILDREN IN THE EARLY SCHOOL PERIOD

Abstract
This paper analyses the changes and development of preciseness as one of the abilities that defines the motor space of children. The changes in manifestation of preciseness are determined analyzing the results from 6 tests for preciseness, four for preciseness with throwing and two for preciseness with leading, applied at the same group of children in two consequential years. A longitudinal research was realized at the sample of 123 male 6 years old children in initial measurement, also measured a year later as a seven years old in the final measurement. Differences were estimated using basic statistic parameters and t – test. Obtained results point out on statistical significant differences in results of five applied tests and numerically better but statistical insignificant differences in one tests. These suggest on positive changes in the segment of preciseness and points out on certain positive development changes in their manifestation.

Keywords: motor abilities, development, children, test.

Тази статия анализира промените и развитието на прецизност като една от възможностите, които определят моторното пространство на децата. Промените в проявлението на прецизност се определят като се анализират резултатите от 6 тестове – четири за хвърляне и две за прецизност.

Изследването е направено върху 123 бр. момчета в две последователни години (6–7 г.). Разликите са изчислени с помощта на основни статистически параметри и Т – тест. Получените резултати сочат статистически значими разлики в пет от прилаганите тестове и статистически незначителни разлики в един от тестовете, което предполага положителни промени в развитието на прецизността и посочва развитие в нейното проявление.

INTRODUCTION

Motor abilities are the essence of human motor space. Their development is based on human native characteristics and it`s a result of development and training (Kukolj, 2006). The level of manifestation and development of motor abilities determines the level of acquisition of motor skills and habits (Matič, 1978). Different level of their development suggest on different level of motor efficiency and it`s also highly related with development of human individual

potentials (Jovanovski, 2013). Motor abilities in children are manifested and developed differently, compared with the adults (Jürimäe & Jürimäe, 2001; Pišot & Planinšec, 2005, Bala & Katić, 2009). Findings about the structure of motor space of children in every period of age and every phase of development process are especially important issue. Their manifestation is determined not just by the human native characteristics and training (Kukolj, 2006), but also are highly related by the impact of development characteristics in every period of age.

Preciseness is one of the abilities that define human motor space. In many sports such as football, basketball, volleyball, karate, gymnastics, bowling etc., preciseness is one of the main components for success. Preciseness is commonly defined as ability to perform properly directed and optimally dosed movements (Kurelić et al, 1975; Gajič, 1985; Nicin, 2000). It`s manifested in movements when certain target should be hit, or when the movement should be performed by precisely defined path (Jovanovski, 2013). Manifestation of preciseness and its efficiency is related with proper evaluation of spatial and time parameters on defined system of movement and with appropriate movement reactions on those changes. Basic information to create main and corrective movement patterns for preciseness are created in the middle brain, helped by visual and kinesthetic senses (Jovanovski, 2013). Realization of precise movements also requires visual information or coordination eye – hand and eye – leg (Gajic, 1985). Regarded to this, as a part of the system of motor abilities that defines human motor space, preciseness is closely related with coordination. We could not found enough information about the development of preciseness during the childhood, the degree of heredity, as well as the differences between males and females regarded the manifestation of preciseness. Considering the fact that manifestation of preciseness is related with coordination and depends from visual sensation and visual ability, information's about their development could give same explanations upon sensitive periods and improvement of preciseness.

Speaking about the latent structure of preciseness and according it`s manifestation in different movements, based on a different criteria, preciseness is mostly manifested as: preciseness with leading, where objects or body parts are leaded toward certain goal and preciseness with pitching/throwing (Kurelić et al, 1975; Gajič, 1985); preciseness with arm and preciseness with leg; according to the speed of realization of movements: fast and slow preciseness; considering the duration of preciseness movement: long – lasting and short lasting preciseness (Gajic, 1985; Jovanovski, 2013) etc. Results achieved in movements that require preciseness are variable and often depends from the influences of many subjective and objective factors, such as: fatigue, emotional condition, visual sensation and visual ability, speed of flow of information, concentration, balance, as well as the level of training,

age, gender, alcohol use etc. It is confirmed that fatigue and emotional condition have a negative influence upon manifestation of preciseness. From the aspect of manifestation of preciseness at children and the structure of children`s motor space, most of the studies that investigate the structure of children's motor space do not conduct tests for preciseness. In some of the analysed studies where these types of movement tasks were included, preciseness was defined depending from the applied model of research, the structural model (Metikoš et al, 1989) and the functional model or model of hierarchic structure (Kurelić et al, 1975). In analysed studies preciseness was isolated as separate factor named as: preciseness with pitching from sitting and standing position isolated at 6 years old children (Popeska 2009; 2011); preciseness as independed factor (Rajtmajer & Proje, 1990; Rajtmajer, 1993); preciseness with leading and preciseness with pitching defined at 7 years old children (Popeska, 2009); preciseness with pitching objects with hand (Popeska, 2011). Considering the functional model or the model of hierarchic structure, preciseness was isolated as a separate factor named as "fine motoric" or a mechanism for harmonization of motor units during performance of preciseness regulated by the mechanism for synergetic regulation (Perić, D, 1991).

All previously mention notes about preciseness, emphasize that motor abilities, including preciseness are in relation with certain period of age in childhood. Characteristics such as uncompleted development, uncompleted regulations of CNS, ongoing functional development, individual tempo of development, concerning different "biological time" on every individual, determine the changes in all development segments during childhood. Therefore, findings in every single segment of development, considering the motor development as well, are important for effective pedagogical work with children oriented toward children's individual needs. Considering the impact of process of development upon the manifestation and development of motor abilities, as well as their variations during different periods of childhood, the aim of this paper is to determine the changes of preciseness at the same group of children and factors that predicted those changes.

MATERIALS AND METHODS

With aim to determine the changes in manifestation of preciseness at the same group of children at the age of six and lately at the age of seven years old, we conducted a research with longitudinal character, realized on a sample of 246 examiners, first and second grade pupils in five primary schools in Skopje, Republic of Macedonia. The initial measurement was realized on a sample of 123 six years old male children, measured again a year later in the final measurement as seven years old one.

Six motor test were applied for estimation of preciseness: four tests for estimation of preciseness with throwing and two applied for preciseness with leading. Following tests were used: Throwing circles on stick (PIOBS), Throwing tennis ball in vertical target with arm (PITET), Throwing ball in horizontal target with arm (PITHC), Throwing ball in vertical target with leg (PIVCN), for estimation of preciseness with throwing and Leading with short stick (PVGKS), Leading with long stick (PVGDS) for estimation of preciseness of leading. Selection of applied tests was based on children`s age and possibilities, results of previous researches conducted with children, as well as recommendations of researchers that previously explored this issue (Dukovski, 1984; Rajtmajer & Proje, 1990; Rajtmajer, 1993; Perić, 1991; Popeska 2009; 2011). All six tests were applied as three item tests, were realized with three repetitions. Test characteristics for this group of examiners, in both age periods were tested. With the sample of six years old examiners, it was determined that all four tests for estimation of preciseness with pitching have bad sensitivity, good validity, lower and not significant reliability (from.42 to .63) that suggest on a test that are highly influenced by other unsystematic factors. The two tests for estimation of preciseness with leading have good validity and representativity (from .61 to .69) and reliability which is lower or equal to the limit of significance (Popeska & Jovanova – Mitkovska, 2014). Tested on a sample of 7 years old children, tests for estimation of preciseness with throwing have low discriminativity, satisfy validity, bad reliability and average level of representativity of the tests. Both tests for evaluation of preciseness with leading are discriminative, have good validity and reliability at the lower part of significance (Mitevski, Popeska & Jovanova – Mitkovska, 2015).

Regarded the methods for data analyses, basic descriptive statistic parameters were calculated at results from motor measurements at both age periods. Differences in achievements in results obtained at six applied tests for preciseness were estimated using t – test. The significance of differences is determined on a level $p < 0.01$ and $p < 0.05$.

RESULTS AND DISCUSSION

Results from descriptive statistics parameters of motor tests applied for estimation of preciseness at six and seven years old children are presented in Table 1 and Table 2. Results from preciseness with throwing are summarized achievements from three attempts for one repetition, or nine attempts in total for each of four applied tests.

Table1: Basic measures of central tendency, dispersion and normality of distribution of motor tests used for estimation of preciseness at 6 years old children (first grade pupils)

	Mean	SD	MIN	MAX	Range	KS	p
PIOBS1	0,69	0,85	0	3	3	0,32	p < ,01
PIOBS2	0,89	0,84	0	3	3	0,23	p < ,01
PIOBS3	0,93	0,88	0	3	3	0,24	p < ,01
PITET1	5,18	3,17	0	14	14	0,12	p < ,10
PITET2	5,79	3,32	0	14	14	0,13	p < ,05
PITET3	5,54	3,12	0	12	12	0,11	p < ,10
PITHC1	2,70	2,59	0	14	14	0,15	p < ,01
PITHC2	3,07	2,86	0	12	12	0,17	p < ,01
PITHC3	3,45	2,76	0	12	12	0,14	p < ,05
PIVCN1	3,09	2,19	0	10	10	0,16	p < ,01
PIVCN2	3,53	2,31	0	11	11	0,13	p < ,05
PIVCN3	3,37	2,40	0	14	14	0,16	p < ,01
PVGKS1	43,93	9,38	22	61	39	0,09	p > ,20
PVGKS2	43,21	9,86	20	64	44	0,07	p > ,20
PVGKS3	44,35	9,07	22	58	36	0,08	p > ,20
PVGDS1	42,89	9,47	22	58	36	0,10	p < ,15
PVGDS2	44,02	9,62	20	64	44	0,12	p < ,05
PVGDS3	44,37	9,02	21	60	39	0,13	p < ,05

According the values of arithmetic mean, in the initial measurement at the age of six (Table 1), improvement of tests results from first to third repetition is noted for the tests Throwing circles on stick (PIOBS) and Throwing ball in horizontal target with arm (PITHC). In other two tests, the best results are achieved in the second repetition. Continuous improvement from first to third repetition, at the age of 7 (Table 2) is noted for the tests: Throwing ball in horizontal target with arm (PITHC), Throwing ball in vertical target with leg (PIVCN), while for the other two tests, best results are achieved in the second repetition. Considering the characteristics of the tests, the number of repetitions as well as the findings that other objective and subjective factors effects on final performance (short lasting concentration and attention, problems with vision, local fatigue and impact of emotional condition and motivation on manifestation of preciseness) these variations are expected and understandable.

Regarded the achievements of the tests for estimation of preciseness with leading, the best results for the group of 6 years old children (Table1) are achieved in the second repetition for the test leading with short stick (PVGKS) and in the first repetition for the tests leading with long stick (PVGDS). In the final measurement, at the age of seven, best results for both tests are achieved in the second repetition. Beside previous explanation about the test

characteristics, other explanation for these results, particularly changes in best achievements in three sequential repetitions is the use of stick for realization of these two movement tasks. Namely, the sticks and its weight are in correlation with different level of arm strength, which is the reason for local muscle fatigue. This effects on the final test performance and bad results.

Table 2: Basic measures of central tendency, dispersion and normality of distribution of motor tests used for estimation of preciseness at 7 years old children (second grade)

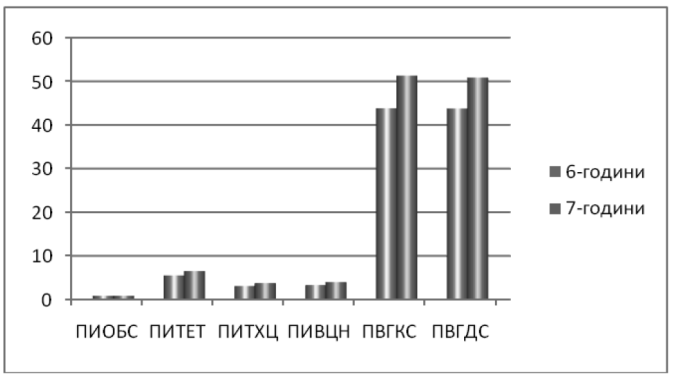
	Mean	SD	MIN	MAX	Range	KS	p
PIOBS1	0,76	0,74	0	3	3	0,26*	p < ,01
PIOBS2	0,87	0,88	0	3	3	0,24*	p < ,01
PIOBS3	0,84	0,84	0	3	3	0,25*	p < ,01
PITET1	6,38	3,21	0	13	13	0,11	p < ,15
PITET2	6,75	3,53	0	16	16	0,09	p > ,20
PITET3	6,38	3,65	0	14	14	0,09	p > ,20
PITHC1	3,46	2,81	0	12	12	0,13	p < ,05
PITHC2	3,87	2,84	0	13	13	0,13	p < ,05
PITHC3	3,95	3,03	0	12	12	0,14	p < ,05
PIVCN1	3,91	2,61	0	11	11	0,13	p < ,05
PIVCN2	3,98	2,51	0	11	11	0,16*	p < ,01
PIVCN3	4,02	2,29	0	11	11	0,12	p < ,10
PVGKS1	51,90	8,20	29	66	37	0,11	p < ,10
PVGKS2	50,89	8,48	27	66	39	0,07	p > ,20
PVGKS1	51,07	8,84	25	70	45	0,08	p > ,20
PVGDS1	50,74	8,47	28	64	36	0,10	p < ,20
PVGDS2	51,29	8,00	31	66	35	0,08	p > ,20
PVGDS3	50,46	8,82	25	65	40	0,14	p < ,05

Table 3. Comparative analyses of tests for preciseness applied at 6 and 7 years children **(t –test)**

test	age	X	SD	Sx	T – test	P
PIOBS	6 years	,84	,58	,05	,23	,821
	7 years	,82	,57	,05		
PITET	6 years	5,50	2,38	,22	-3,00	,003
	7 years	6,50	2,84	,26		
PITHC	6 years	3,07	2,08	,19	-2,53	,012
	7 years	3,76	2,18	,20		
PIVCN	6 years	3,33	1,75	,16	-2,71	,007
	7 years	3,97	1,96	,18		
PVGKS	6 years	43,83	7,63	,69	-8,00	,000
	7 years	51,29	6,97	,63		
PVGDS	6 years	43,76	7,08	,64	-7,82	,000
	7 years	50,83	7,10	,64		

Differences in average tests achievements between initial and final measurement at the same group of children, obtained using t – tests, are presented in Table 3. The statistical significance of obtained results is determined at the level $p < 0.05$ and $p < 0.01$. Statistically significant better results on a level 0.01 in final measurement at the age of seven, are achieved in following two tests for estimation of preciseness with leading: Leading with short stick (PVGKS) and Leading with long stick (PVGDS). At lower level of significance, 0.05, statistically significant better results in final measurement are obtained in following three tests for preciseness with throwing: Throwing tennis ball in vertical target with arm (PITET), throwing ball in horizontal target with arm (PITHC), and throwing ball in vertical target with leg (PIVCN). For better understanding, obtained differences in children's achievements in all six applied tests for preciseness in initial and final measurement, are also presented with graphics (Graphic 1).

	PIOBS	**PITET**	**PITHC**	**PIVCN**	**PVGKS**	**PVGDS**
6 years	0,84	5,5	3,07	3,33	43,83	43,76
7 years	0,82	6,5	3,76	3,97	51,29	50,83
	US	SIG	SIG	SIG	SIG	SIG



Graphic 1. Graphic view of achievements at the age of 6 and 7 on the motor tests for estimation of preciseness.

Progressive improvement of tests results from initial to final measurement at five from six applied tests for preciseness is logically and expected considering the process of development and maturation. This improvement beside the physiological bases, it could be also explained with acquisition of the movement tasks considering that they performed them for second time, as well as with greeter motivation and wish for better performance and success, characteristics specific for seven years old children. Improvement

of preciseness during one year period is also a result of changes that occurs as a result of children's growth and development, changes in morphologic characteristics and their impact on manifestation of motor abilities, especially in the tests for leading, as well as changes in the process of motor learning (Planinšec, 1995; Pišot & Planinšec, 2005), children's everyday physical activity at school and at home and the process of emotional and psychological maturation of children (Malina, Bouchard & Bar – Om, 2004). Related to emotional maturation, speaking about children, emotional condition has a great role in preciseness of performed movements. Children are emotional easy disturbing, especially in new and unknown situations (Gallahue, 1987, in Age group development) such as motor measurements. Therefore, emotional condition is a factor for variability of result in tests for preciseness.

Statistically insignificant differences between two tested periods are obtained only for the test Throwing circles on stick (PIOBS). Although the numeric differences are very small, it`s specific that at the age of seven, children had achieved lower results. This could be explained with the structure of the test, development characteristics and related to this, the relations between morphologic structure and manifestation of motor abilities in this particular period. Analyzing the structure of the test it`s noted a specific manner of throwing circles in order to achieve the required goal – hitting the stick. This requires a rotary movement of the circle, while the direction of the circle should be parabolic forward. This movement is unusual and hard to be performed by the children in the early school period. Beside the proper technique, the coordination eye – arm (Gaji , 1985) is also noted as a factor for success at this test. Because of insufficient synchronization between certain body parts and slower procession of information, six and seven years old children have not yet established eye – hand coordination (Gallahue, 1987 in Age group development). Other factors that determine the final result at this test are the amount of strength used to throw the circle, as well as good coordination of rotary movement of the circle and the direction of throwing, which is influenced by the level of development of coordination as integrative motor ability. All these factors are determined by the individual development of nervous system and individual tempo of the processes of growth and development. Bad technique of throwing, lack of coordination of complex movements, different intensity of growth and development of different body parts and lack of their synchronization with manifestation of motor abilities are probably some of the reasons for children`s lower achievements at this test. Similar results are noted in the transversal study with same age group of children conducted by Popeska (2009).

CONCLUSION

Preciseness is one of the abilities that define human motor space. Changes that occurs in manifestation and development of preciseness in different age periods effects on motor efficiency and achievements in many sports such as football, basketball, volleyball, karate, gymnastics, bowling etc., in which preciseness is one of the main components for success. Improvement of preciseness is determined by many factors physiological related with the age and development characteristics in every single period of age. Considering the impact of process of development upon the manifestation and development of motor abilities, as well as their variations during different periods of childhood, the aim of this paper is to determine the changes of preciseness at the same group of children at the age of 6 and lately at the age of 7 years and factors that predicted those changes. The research was realized as a longitudinal study conducted on a sample of 246 examiners, first and second grade pupils in five primary schools in Skopje, Republic of Macedonia. Four tests for preciseness with throwing and two tests for preciseness with leading were used. Results from applied t – test suggest that statistically significant better results in a final measurement, at the age of seven were achieved in five from six applied tests. Considering that results are obtained using longitudinal approach, we could concluded that positive changes in development of preciseness are result of the process of growth and development.

Statistically insignificant and more interesting, numerically lower results, obtained at the age of seven, were noted only in the test Throwing circles on stick (PIOBS). This unexpected result could be explained with the requirement of the test or complex movement manifested as bad technique for realization of required movement tasks and negative influence on a final results, as well as other characteristics such as insufficient synchronization between eye and arm, lack of coordination for complex movements, different tempo of growth and development of different body parts and the lack of synchronization with manifestation of motor abilities, emotional condition of children etc. All these as well as continuous improvement of achievements in the period from six to seven years is related with changes that occurs as a result of children's growth and development, such as different biological time of growth and maturation as well as individual tempo of development, previous motor experience, changes in morphologic characteristics and their impact on manifestation of motor abilities etc. Other characteristics that also explains some of obtained results are that in the period between 5 and 7 years, children in general are farseeing and not prepared to look close for a long period (Gallahue, 1987, in Age group development). Regarded this, in childhood, visual sensation improves in the period between 5 and 7 years of age (Haywood & Getchel,

2004). After the age of 5 improves the ability to follow objects with eyes and control of movements with eyes, visual sensitivity continuously improves, but is not yet well developed until the age of nine (Williams, 1983, referred in Haywood & Getchell, 2004).

Regarded the improvement of preciseness during PHE classes, many activities could be implemented in current PHE curriculum in order to develop preciseness. Related to this, we suggest implementation of movement tasks and games which aim will be to strike at certain goals – horizontal or vertical, static or moving targets with different size, placed on a different distances using different objects to strike (tennis balls, standard balls, medical balls with different size etc). We suggest activities such as picado on the wall or at the floor, different size objects leaded with arm or with leg; leading ball using other object for example sticks, with or without hitting in certain goal or target, or activities like golf, cricket, grass hockey, baseball etc. Other advantage of these activities, beside their implementation as new, innovative PE content are possibilities for their realization in classroom as well as an outdoor activities, or in schools with lack of material conditions, equipment or sports facilities. These also means using objects used in children`s everyday life which could be also made by children. Beyond this, implementation of these contents at regular PHE classes will have an influence on development of other motor abilities, as well as a positive influence on cognitive segment, emotional and social component, especially in situations when implementing movement tasks with leading, throwing and striking in different targets as a part of different movement games.

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