

Original research article

THE INFLUENCE OF THE ELEMENTS OF BASKETBALL ON THE DEVELOPMENT OF MOTOR SKILLS IN CHILDREN WITH SPECIAL NEEDS

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Marko Radenković, Dragana Berić, Miodrag Kocić

Faculty of Sport and Physical Education, Niš, Serbia

Abstract. *A longitudinal study was carried out on a sample of 27 subjects, pupils attending special schools "14. October" in Nis, divided into two groups performed in order to determine the influence of the elements of basketball on the development of the motor abilities of children with special needs. For that purpose a battery of 7 tests of basic motor skills was used. The experimental program lasted for four weeks. The experimental group worked following a corrected and specifically tailored basketball program, while the control worked following a steady program proposed by the Ministry of Education of the Republic of Serbia. Two measurings took place, the initial at the beginning of the experiment, and the final at the end of the experiment. All of the results were statistically analyzed and presented in tables. The conclusions have partly confirmed the hypothesis that the elements of basketball technique have a statistically significant impact on the development of certain motor skills.*

Key words: *basketball, mental retardation, adaptation, physical activities, motor skills training.*

1. INTRODUCTION

During adolescence, daily physical activity becomes essential for the improvement of health, the proper growth and development of children with disabilities, and also the reduction of risk factors which influence the formation of cardio-vascular and metabolic disorders later in adulthood. Another important indicator of the health of children and adolescents is physical fitness, which is important for health in later life (Cvejić, Pejović & Ostojčić, 2013). The existing guidelines recommend adolescents have at least 60 minutes of moderate to intense physical activity several days per week (Strong, Malina &

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Corresponding author: Marko Radenković

Faculty of Sport and Physical Education, St. Čarnojevića 10a, 18000 Niš, Serbia

Phone: +381 (0) 18 510 900 • Fax: +381 (0) 18 242482 • E-mail: radenkom9@gmail.com

Bimkie, 2005). Regular physical activity can promote an active way of life, and increase physical and work capacities in this segment of the population (Carmeli, Barchad, Lenger, & Coleman, 2002).

Disabilities such as mental retardation can hinder the capability of learning and being active in some kind of educational environment, including physical education. Since childhood, children with mental retardation progress more slowly than children with normal intelligence when it comes to motor skills (Shapiro & Dummer, 1998).

Regular physical activity during one's life is recommended for the increase of emotional stability (Fernhall, 1993). The benefit of doing sports for people with special needs is very similar to that of people with normal development. Those useful effects are not only manifested on physical health, but also on psychological health, including the cognitive, social, affective and moral development of children (Franciosi, 2007).

The close connection between physical activity and the endurance of an individual who is suffering from intellectual disability requires an increase in muscle strength through the preparation of training programs, which are especially important because of their positive effect on everyday activities (Franciosi, 2007). Therefore, it is necessary to create the needed prerequisites for the physical activity of adolescents with intellectual disability. This can be accomplished through various physical activities (physical education, inclusive activities, class activities, etc.), under the guidance of a qualified physical education professor (Kenneth, Beets, & Combs, 2009).

Effective involvement of people with mental retardation in sports competitions requires not only thorough knowledge about all the modes of developing motor and functional skills, but also an understanding of their relationships and interactions with the cognitive skills and psychological potentials of these athletes. All of these components can be presented in the following triangle: "physical potential – cognitive potential – sports performance". Sports performance can be viewed as a product of physical and cognitive potential. Among individuals with mental retardation, this cognitive potential includes "intelligence" as a multidimensional group of reasoning, planning, making decisions and learning from experience (Van de Vliet et al., 2006).

A team sport is a popular way of including individuals with intellectual disability in physical activity (Gencoz, 1997). Sport can help athletes with mental retardation to begin appreciating themselves more, to improve their quality of life, and it can be fundamental for socialization and cooperation. Team sports, like basketball, are a popular way for individuals with mental retardation to become a part of some kind of physical activity (Baldari et al., 2009). Basketball is not only used as a part of planned physical activities for intellectually disabled individuals, but also as an independent sport activity for these individuals, because it leads to the development of their motor skills (running, jumping, shooting, etc.) through team work and cooperation among individuals with the same level of disability (Gencoz, 1997). Muscle strength, that is, the fundamental capacity of individuals without the disability and with the disability to perform effective and coordinated movements is considered to be ineffective when it comes to chronic cases of mental retardation (Tsimaras et al., 2009). It is known that muscle strength and balance recede in adulthood in individuals with mental retardation, which is the time when other health risks appear, such as overweight problems and obesity (Lahtiner, Rintala, & Malin, 2007). Muscle strength of the lower extremities is very important for general health, for the performance of daily activities, and for the performance of some skills which are connected to work when it comes to individuals with mental retardation (Tsimaras et al., 2009). Basketball is very popular because it involves motor skills such as running,

jumping, shooting, and it involves mutual cooperation among players. Training can lead to psychophysical improvement among individuals with mental retardation by satisfying their primary needs and by increasing their need for living.

During the developmental period, mental retardation was defined as a significant intellectual function below average, which exists as a deficiency in adopted behaviour. Retardation begins before the age of 18, and it does not always last his/her whole life. Mental retardation occurs more often among men than women (Baldari et al., 2009).

The educational system of children with disabilities in Serbia is organized in three basic ways:

1. Special education in special schools for children with disabilities;
2. Special education in special classes in regular schools which set up for students with the same type of disability;
3. Regular education in the same class with the rest of the students, but without systematic support and adjustment to the special needs of these students. Therefore, their achievements are minimal, and a large number of those children repeat the grade or leave school.

Children with disabilities go to special schools which are divided by a special committee whose job it is to classify mentally retarded children. The committee estimates the level and the type of disability. Teachers who work in classes with large numbers of children are not prepared or motivated for working with these children. Special schools function as an independent and parallel system along with the regular system without mutual connection.

It is a fact that a special school is more adapted to the needs of children with disabilities than regular schools - in terms of the teachers' education, in terms of equipment, and also in terms of applying special methods in working with students.

The aim of this research is to establish the level of influence of basketball elements on motor development (speed, coordination and accuracy) of children with disabilities, and also to adapt particular segments of basketball and adjust them to suit the needs of these children.

2. THE METHOD

The research itself is longitudinal in character, and it lasted for four weeks. The research contained pedagogical, methodological, scientific, and explorative methods of using basketball elements in the development of specific motor skills among children who are disabled.

2.1 The sample of participants

The sample of participants (N=27) was extracted from the population of students attending the school for children with special needs "14. October" in Nis, of both sexes, with a chronological age of 16-19, who took part in regular physical education classes. Their IQ was between 70 and 80. The sample was divided into two sub-samples: the experimental (N=13) and control sub-sample (N=14).

The students in the experimental sub-sample followed a modified program of basketball elements adjusted to the intellectual abilities of the children, while the students

of the control sub-sample followed the program designed for special schools that was written by the Ministry of Education of the Republic of Serbia.

2.2 The sample of variables

The 20 meter run with a high start	(MT20m in m)
Hand tapping	(MTPR)
The standing jump	(MSDM in cm)
Push-ups	(MSKL)
Depth reach	(MDPK in cm)
Torso lifts from a bench	(MDTK)
Throwing darts	(MPIK)

The measuring instruments used to evaluate the motor skills characteristics are taken from the textbook "Anthropological basics of basketball" (Jovanović - Golubović, & Jovanović, 2003).

2.2 Statistical Analyses

For all the variables, the basic parameters of descriptive statistics were calculated (Mean and Standard Deviation). In order to determine the statistically significant difference for each variable between the groups the One Way ANOVA method and POST HOC (LSD) test were used. Statistical calculations were carried out using the Statistics software SPSS 15.0.

3. THE MODIFIED PROGRAM ELEMENTS OF BASKETBALL

As previously mentioned, the control group worked following the program prescribed by the Ministry of Education of the Republic of Serbia for special schools, while the experimental group worked following a modified training program of basketball. The modified program worked for four weeks, two classes per week. The introductory part of the class was the warm-up, the main part consisted of the basketball program and the final part consisted of class relaxation exercise. The first week focused on ball control: dribbling the ball with at least three rebounds, dribbling more than three times (ball handling), free guidance (control) of the ball in a stationary position (SP), SP controls the ball with his left or right hand, keeping the ball moving (left, right, forward and back), keeping the ball running in a straight line the entire length of a basketball court, controlling the ball in the SP without looking at it. The second and third week focuses on passing and catching the ball. In the main part of the class the following was practiced: passing the ball with both hands from the chests to the player who was 3 meters away – catching the ball from 3 meters away, passing the ball with both hands from the chest to the player with one ball bounce on the ground, catching the bouncing ball, passing the ball behind the head at a distance of 7 meters – catching the ball at a distance of 7 meters, in SP passing the ball to a player who is moving, catching the ball while walking, in SP passing the ball to a running player, catching the ball while running forward, from SP passing the ball with one hand to another player at a distance of 5 meters, catching the bouncing ball while running, from SP passing

the ball while one player is a passive defender - catching the ball in the air while running with a passive defense, from SP passing the ball while one active defensive player is in the game, while moving, passing the ball while two active defensive players are in the game; while moving, passing the ball while four active players are in the game – catching the ball from a player who is moving, while moving, passing the ball while five active players are in the game – with active defense catching the ball from the player who is moving. In the main part of the class, shooting was the focus of week four: keeping the ball, holding the ball in a position to toss, tossing the ball upward, shooting at the hoop from a close distance (close range under the hoop – clear shoot); the student takes ball that the teacher is holding like on tray and makes a two-step (right, left foot) and shoots with the fist-behind-the-ball technique; dribbles, does a two-step and shoots with the fist-behind-the-ball technique, the same as in the previous exercise but with the ‘layup’ technique; shooting at the basket with one hand at a distance of 1,5 meters; shooting at the basket with one hand from a distance of 3 meters; shooting at the basket from a distance of 5 meters; shooting at the basket while a passive defender is in the game, shooting at the basket while one active defender is in the game.

4. RESULTS

Table 1 Univariate analysis of variance between the control and experimental sub-samples in the motor area of the initial and final measuring

Variables	Group	N	Initial measuring			Final measuring				
			Mean	Std. Dev.	F	Sig.	Mean	Std. Dev.	F	Sig.
MT20m (in m)	CON	14	6,5007	1,3436	3,607	0,069	7,4243	3,2998	2,551	,123
	EXP	13	6,8538	3,93677			5,7385	2,0468		
MTPR	CON	14	19,14	10,136	0,596	0,447	22,50	12,996	,011	,919
	EXP	13	26,54	11,118			32,77	12,464		
MSDM (in cm)	CON	14	100,79	36,587	0,575	0,455	101,50	37,717	,138	,713
	EXP	13	121,31	50,026			128,38	49,009		
MSKL	CON	14	4,57	5,867	3,443	0,075	4,86	5,998	11,91	,002*
	EXP	13	5,92	9,81			8,54	12,218		
MDPK (in cm)	CON	14	10,64	15,78	0,453	0,507	9,50	14,367	,017	,898
	EXP	13	11,62	19,99			10,77	17,522		
MDTK	CON	14	6,50	8,671	0,035	0,853	10,21	11,410	,196	,662
	EXP	13	8,85	10,984			13,00	13,892		
MPIK	CON	14	9,50	6,903	0,026	0,874	11,29	6,900	,439	,513
	EXP	13	13,46	7,276			18,31	5,559		

*represents a statistically significant difference at level $p \leq 0.05$

Comparing the results of the arithmetic means based on the coefficient F (the relationships and their significance), we could say that no significant statistical difference was determined in any of the tests at the initial measurement (Table 1). These are basic forms of movement which are, in a way, under the influence of genetic factors, and, on the other hand, under the influence of motivational factors. Comparing the results of arithmetic mean at the final measuring based on the coefficient F (the relationships and their significance), it can be concluded that a significant statistical difference exists only for the variable MSKL (Sig = ,002). It refers to the repetitive strength of the shoulder belt and arms, which belongs to the basic motor activities which most children use in their

daily activities. It is most probable that the physical education they have had in the past influenced the development of repetitive strength. Overall, the results increased slightly in every variable, but do not have a statistical significance. However, that does not minimize the value of the results; on the contrary, the achieved results are encouraging because they have been achieved after only eight classes.

Table 2 The significance of the differences between the control and experimental sub-samples of participants at the initial and final measuring of motor skills using the t – test.

Variables	Group	N	Initial measuring			Final measuring				
			T	df	Sig.	Mean Diff.	T	df	Sig.	Mean Diff.
MT20m (in m)	KO	14	-,317	25	,754	-,35313	1,580	25	,127	1,6858
	EK	13								
MTPR	KO	14	-1,808	25	,083	-7,396	-2,092	25	,047*	-10,27
	EK	13								
MSDM (in cm)	KO	14	-1,223	25	,233	-20,522	-1,604	25	,121	-26,89
	EK	13								
MSKL	KO	14	-,438	25	,665	-1,352	-1,005	25	,324	-3,681
	EK	13								
MDPK (in cm)	KO	14	-,141	25	,889	-,973	-,206	25	,838	-1,269
	EK	13								
MDTK	KO	14	-,618	25	,542	-2,346	-,571	25	,573	-2,786
	EK	13								
MPIK	KO	14	-1,452	25	,159	-3,962	-2,898	25	,008*	-7,022
	EK	13								

*represents a statistically significant difference at level $p \leq 0.05$

Table 2 offers the results of the t-test of motor skills between the control and the experimental sub-samples at the initial and final measuring. No statistical significance was determined. It is very difficult to determine the real values and to make conclusions when we talk about children with special needs, because their motivation and mood to do something can change quickly. After the analysis of the obtained results in the final part of the table, we can see that a statistical significance exists only in the hand tapping test (MTPR) and dart throwing (MPIK). It was already mentioned that the physical education classes affected the development of the motor skills which were measured, but there were no statistically significant differences. In this case, statistically significant results were found only for hand tapping and dart throwing. Both of the motor skills are influenced by genetic factors and the central nervous system. Segmented speed and precision are under the influence of motivational factors, which was crucial in this case. The children were competing with each other, and the tests themselves were not very difficult; therefore, the results were statistically significant.

DISCUSSION

Since 2000, the people in our country have been working more on promoting and developing inclusive education. Some cities in Serbia (such as Subotica, Kula, Pančevo, Beograd, Niš, Novi Pazar, Novi Sad) are developed inclusive practice in local kindergartens

and schools. Due to the lack of legislation, alternative ways for supporting children, parents and teachers are developing i.e., removing or overcoming architectural barriers (Lazor, 2009).

Based on previous research and the use of a formal scale for the evaluation of mental development, people who have an IQ between 51 and 75 are considered to be individuals with special needs. Since early childhood, these people have slightly slow psychomotor development, are several months late compared to normal development. They show slower abilities of coordination and other motor skills, and they get sick more often. As the children grow up, we can see the differences more clearly. The ability to observe, concentrate, remember, the ability to identify relationships, make generalizations, make conclusions and solve easier problems are limited and not developed enough (Bala, 1984).

Children with disabilities learn in different ways; therefore it is not easy to find the best methods. Some children learn best when they are alone, through the activities that are done at their own pace, while others, on the other hand, enjoy cooperating with other children of their own age. To some children, movement and touch are very important, and others rely on visualization, while some of them use language and speaking as a primary instrument of learning. Some children are very skilled at finding connections between objects and events, and others are prone to observing. No matter how they learn, children will be successful when the teacher creates conditions which respond to their way of learning (Lazor, 2009).

This paper represents a modest contribution to the development of new methodological procedures in working with children with special needs. Elements of basketball were used as special methods of working with disabled children as a means of developing basic and complex motor skills.

CONCLUSION

Based on the participants, goals, assignments and the set hypothesis, the following conclusions were reached:

1. The results of the t-tests and univariate analysis of variance at the final measuring compared to the initial state have shown that the elements of basketball statistically and significantly influenced the development of speed and precision among the students of the experimental group, and the given hypothesis H has partially been confirmed. Therefore, we can conclude that the corrected basketball program adjusted to suit children with special needs significantly influenced the development of particular motor skills. This is a positive result because only 8 classes of basketball were held, which indicates that basketball elements can be used as a special method while working with children with special needs,
2. The results would have been far better if there had been more classes over a longer period of time. Working with children with special needs requires patience, persistence, love, motivation and continuous contact with children. The content has to be adjusted to their mental and morphological characteristics.

This paper can be used as a pilot project for some larger and more extensive research of a longer duration, in order for the results to be more valid and more useful for pedagogical theory and practice.

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UTICAJ ELEMENTA KOŠARKE NA RAZVOJ MOTORIČKIH SPOSOBNOSTI DECE SA POSEBNIM POTREBAMA

Autori su sprovedli longitudinalno istraživanje na uzorku od 27 ispitanika, učenika koji nastavu pohađaju u specijalnoj školi "14 Oktobar" u Nišu, podeljenih u dve grupe. Njihov učinak je meren kako bi se utvrdio uticaj elemenata košarke na razvoj motoričkih sposobnosti dece sa posebnim potrebama. Za to je upotrebljena baterija od 7 testova bazičnih motoričkih sposobnosti. Eksperimentalni program trajao je četiri nedelja. Eksperimentalna grupa vežbala je prema korigovanimi posebno pripremljenom program košarke, dok se je kontrolna grupa vežbala prema programu koji je predložilo Ministarstvo obrazovanja Republike Srbije. Izvršena su dva merenja, inicijalno na početku eksperimenta, i finalno na kraju eksperimenta. Svi rezultati su statistički analizirani i predstavljeni u tabelarnoj formi. Zaključci su delimično potvrdili hipotezu da su elementi košarkaške tehnike imali statistički značajan uticaj na razvoj određenih motoričkih sposobnosti.

Ključne reči: košarka, zaostalost u razvoju, prilagođavanje, fizička aktivnost, trening motoričkih sposobnosti.