

The influence of sports on the motor development of preschool children



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Abstract

The motor skills that a child develops during childhood greatly influence his abilities later in life. Although it is known that physical activity is one of the most important factors for the healthy development of children, some studies show that more and more children are insufficiently active, which results in obesity and numerous other health losses. Therefore, the goal of this research was to determine the current state of motor skills of preschool children and whether there is a difference in the motor skills of children who play sports and those who do not play any sport. 40 children from a kindergarten in Zagreb between the ages of 5 and 6.5, participated in the research. Within the research, an affirmative hypothesis was put forward, which shows that there are differences in motor skills between preschool children who play sports and those who do not, in favour of those who play sports. This hypothesis was partially confirmed due to the fact that the child athletes showed better motor skills in 4 measured variables, namely: backward polygon, sit-ups in 30 seconds, standing long jump and hand tapping. In the two measured variables, the results show that there is no statistically significant difference between athletes and non-athletes, namely: standing on one leg on a block and forward bend. Although it was shown in the two measured variables that statistically there is no big difference between athletes and non-athletes, the results were still better for athletes, which proves that sports undoubtedly influence children's motor skills and that adults should encourage children whenever possible to enrols in sports or to any physical activity.

Key words

motor skills; parental support; quality of life

Introduction

In contemporary times, experts and laypersons alike increasingly discuss and write about the relationship between physical activity and health. Even before numerous scientific discoveries and research conducted on this topic, it could be assumed that physical activity positively affects and preserves the health of adults and children more than physical inactivity (Mišigoj - Durakovic et

al., 2018). Early life stages, especially childhood, are the most suitable periods for stimulating the development of morphological characteristics, motor and functional abilities. Working with children and encouraging them to engage in physical activities within the family, educational groups, or schools during this period is irreplaceable in later life stages. For children who do not engage in movement, the natural drive for movement decreases, which leaves negative consequences on the development of a child's motor skills, and this is difficult to compensate for in adulthood (Vujičić, Petrić, 2021). Understanding a child's capabilities and the degree of possible influence on anthropological characteristics greatly facilitates working on them. It is essential during the preschool period to enable those motor activities that can maximally transform children's abilities. It is of utmost importance to encourage children to move, play actively, and engage in organized sports activities from an early age, not only due to their positive impact on motor skills but also on physical and mental health (Mihelić, 2024). Milanović (2010) emphasizes that regular sports activity tailored to an individual's abilities, possibilities, and needs has a profoundly positive effect on many aspects, including their biological, psychosocial, and motor development. However, it is necessary to thoroughly understand a child's needs, psychophysical traits, and health before introducing them to sports or physical activities (Pejčić and Trajkovski, 2018).

Research has shown that two out of five children aged between 5 and 8 are obese, have high cholesterol, and elevated blood pressure, and are not physically active (Kalish, 2000). Furthermore, children increasingly suffer from sleep problems and neck pain, which negatively affects their daily functioning and task performance (Perić et al., 2020). Additionally, various studies indicate that in the Republic of Croatia, each subsequent generation performs worse than the previous one, and experts believe this trend will continue (Petrić, 2019). Therefore, the aim of this research was to determine the current state of motor abilities in preschool children and to assess whether there is a difference in motor abilities between children who engage in sports and those who do not engage in any sports.

Methods

The aim of this research is to determine to what extent sports affect the motor abilities of preschool children and whether there is a difference in the motor abilities of children aged 5 to 6.5 years who participate in sports and those who do not engage in any sports.

Basic descriptive parameters were calculated, namely the mean, minimum value, maximum value, and standard deviation of children who engage in sports and those who do not. To determine the differences between athletes and non-athletes, a t-test for independent samples and regression analysis were used to identify whether there is a functional relationship between the dependent and independent variables.

The research was conducted on a sample of 40 children (19 boys and 21 girls), of which 20 children participate in a particular sport, and 20 children do not participate in any sport. The research was conducted at the one kindergarten in Zagreb. At the time of measurement, the children were aged 5 to 6.5 years. Each child was measured individually in 6 variables.

For the purposes of this research, 6 motor variables were measured, based on which the state of the children's motor abilities can be concluded: balance, coordination, repetitive strength, explosive strength, speed, and flexibility. The following tests were used to measure these abilities: standing on one leg on a block (SOLB), backward polygon (BP), sit-ups in 30 seconds (SU30), standing long jump (SLJ), hand tapping (HT), and forward bend (FB). Each child's height and weight were measured, and their BMI was calculated from these measurements.

Results

Table 1

The values of the results in the measured variables for athletes

VARIABLES	ARITHMETIC MEAN	MINIMUM VALUE	MAXIMUM VALUE	STANDARD DEVIATION
Standing on one leg on a block	27.2	12	30	5.9
Backward polygon	15.1	9.69	28	5.3
Sit-ups in 30 seconds	13.1	8	22	6.3
Standing long jump	117.1	94	142	6.3
Hand tapping	32.6	22	44	7.4
Forward bend	-3.9	-22	8	6.7
Body height	121.1	110	135	8.1
Body weight	22.1	16	30	3.3
BMI	15.0	12.8	16.7	1.2

Table 2

The values of the results in the measured variables for non-athletes

VARIABLES	ARITHMETIC MEAN	MINIMUM VALUE	MAXIMUM VALUE	STANDARD DEVIATION
Standing on one leg on a block	25.1	5	30	7.3
Backward polygon	21.2	11.54	42.27	7.0
Sit-ups in 30 seconds	9.7	4	15	2.9

Standing long jump	100.2	32	133	21.0
Hand tapping	27.8	19	38	5.5
Forward bend	0.2	-19	15.5	8.4
Body height	122.2	107	138	6.9
Body weight	23.3	12	36	5.3
BMI	15.4	10.5	23.4	2.5

Table 3

Results of the T-test

	SOLB	BP	SU30	SLJ	HT	FB
Athletes	27.2	15.1	13.1	117.1	32.6	-3.9
Non-athletes	25.1	21.2	9.7	100.2	27.8	0.2
T - Test	0.341	0.002*	0.002*	0.006*	0.018*	0.102

LEGEND: Athletes – *children who engage in sports*, Non-athletes – *children who don't engage in sports*, SOLB – *standing on one leg on a block*, BP – *backward polygon*, SU30 – *sit-ups in 30 seconds*, SLJ – *standing long jump*, HT – *hand tapping*, FB – *forward bend* Note. * $p < 0,05$

In the one-leg standing test on a block, which assessed children's balance, there was no statistically significant difference between athletes and non-athletes. The backward polygon test showed a significant difference in coordination between athletes and non-athletes. Regarding repetitive strength, assessed by performing sit-ups in 30 seconds, athletes also proved to be more successful. The standing long jump test evaluated the explosive strength of the participants, revealing that athletes performed better than non-athletes. Speed was tested using hand tapping in 10 seconds, and it was proven that children who train in sports are more successful or faster than children who do not engage in any sports. Finally, flexibility was measured by the forward bend test, and the T-test results indicated no significant difference in flexibility between athlete and non-athlete children.

Table 4

Results of the regression analysis

	SOLB	BP	SU30	SLJ	HT	FB
r	0.15	0.48	0.47	0.43	0.37	0.26
r^2	0.02	0.23	0.22	0.18	0.14	0.07
Adapted r^2	0.00	0.21	0.20	0.16	0.12	0.04

Standard deviation	6.66	5.77	3.26	18.34	6.20	7.72
Number of measurements	40	40	40	40	40	40

LEGEND: SOLB – standing on one leg on a block, BP – backward polygon, SU30 - sit-ups in 30 seconds, SLJ – standing long jump, HT – hand tapping, FB – forward bend, r – linear correlation coefficient, r^2 –correlation coefficient

Regression analysis determines the functional relationship between one dependent variable, which in this case are the results of motor exercises, and one independent variable, which is whether the child participates in sports. The results of the regression analysis show that the predictor variable, which is sports, does not have a statistically significant relationship with the results of the performed exercises: standing on one leg on a block (SOLB), backward polygon (BP), sit-ups in 30 seconds (SU30), standing long jump (SLJ), hand tapping (HT), and forward bend (FB). R^2 indicates whether the results of the performed motor exercises can be predicted solely from the information on whether the child trains or not. A result above 0.5 would suggest a good relationship between the predictor variable and the measurement results. Results above 0.75 would indicate a strong influence of the predictor variable on the measurement results. However, given the obtained results in this analysis, which are below 0.25 for each measured variable, the relationship is considered weak. In the best case, for the backward polygon exercise (BP) results, we can explain 23.28% of the results by whether the child participates in sports or not.

Discussion

Observing the obtained results, we can conclude that sports have a positive impact on the motor development and motor abilities of preschool children. Children who are involved in a specific sports program, either within or outside kindergarten, achieved better results in almost all measured areas. The interest of this research was also the impact of sports on the measured motor abilities of children, i.e., the correlation between sports and these abilities. Regression analysis showed that sports, or the information that a child practices a sport or not, has a statistically very small share in predicting the results of measured motor abilities, which are: balance, coordination, repetitive strength, explosive strength, speed, and flexibility.

Similar results were obtained in his research by Alwasif (2015), who also studied the impact of sports on the development of motor abilities in children aged 5. Over a three-month period, an experimental group of children attended a sports program three times a week for 50 minutes each session. At the beginning of the study, the experimental and control groups did not differ in their level of motor abilities. However, at the end of the study, the children in the experimental group achieved better results in all measured tests. Similar conclusions were reached by Mehtap (2024) in his research. He proved that sports activities in the form of educational games contribute to the development of motor abilities in children aged 5 and 6 years. The activities were conducted over 12 weeks, twice a week for 30 minutes, and this was sufficient for the children to make progress in

all motor abilities.

Furthermore, the authors Špelić and Božić (2002) aimed in their research to contribute to raising awareness about the importance of early encouragement of sports activities in preschool children for their later motor development. The research involved students from some elementary schools in Pula who had attended a sports program for preschoolers in kindergarten before starting school. The experimental group consisted of 50 students, while the control group consisted of 150 students. The motor abilities measured included: explosive strength, static arm strength, coordination, flexibility, repetitive strength, and speed. The results of the conducted measurements showed no statistically significant difference between children who attended the sports program in kindergarten and those who did not, except for girls in the flexibility measurement. However, it was found that children who attended the sports program in kindergarten were later significantly more involved in extracurricular programs, demonstrating the impact of early involvement in sports activities on developing a positive attitude toward sports and physical activities. When we compare the research results, it is evident that there is a significant difference, as the results obtained in this research show better outcomes for children involved in sports during preschool age.

Wang and Zhou (2024) aim to present a meta-analysis of the effectiveness of exercise training focused on motor development and gross motor skills in preschool children aged 3-6 years. The studies considered had an experimental group that exercised in an organized manner and a control group of children who participated in free play and recreational physical activities. The results showed a statistically significant difference in favor of the experimental group of children who trained. Additionally, the study by Erhan Orhan, Karaçam, and Astuti (2024) aims to investigate how structured physical activities affect children's motor skills, cognitive abilities, and social interactions. The results show that the motor skills of children aged 5-6 years who participate in organized movement activities are remarkably high. This highlights the importance of including structured physical activity programs in early childhood education to promote their overall development.

In the article by Ruban et al. (2024), the authors investigate how sports games and physical exercises affect the development of children's coordination as a critical aspect of their physical development. This article analyzes studies emphasizing the importance of engaging in activities such as basketball, volleyball, rowing, and choreography to improve children's coordination abilities. They conclude that physical activity plays a crucial role in effectively developing children's coordination skills and that it is therefore important to include physical exercises in children's routines, taking into account their age and individual needs.

At the end of the discussion, it can be said that the preschool age is crucial for the development of motor abilities and probably the most promising timeframe concerning preventive strategies based on improved motor abilities (Hestbaek et al., 2017).

Conclusion

The preschool period is the most sensitive time for developing the habit of physical activity, and it is possible to greatly influence a child's body, habits, and abilities in general. It is well-known

that sport or any physical activity positively affects many areas of a child's development, such as social, cognitive, emotional, motor, intellectual, physical condition, and more. Motor skills can be most influenced during childhood, and the degree of innate motor ability determines the strength of external influence on it. Therefore, the aim of this study was to determine the impact of sports on the motor development of children, specifically the differences in motor skills between older children (ages 5 to 6.5) who participate in sports and those who do not engage in any sports. In the tests of standing on one leg on a block and trunk flexion, there were no significant differences between the two groups of children. In all other tests, the children who were athletes achieved better results. When discussing the impact or potential prediction of future results, the conclusion drawn from the regression analysis indicates that whether children engage in sports or not does not significantly predict the results of the conducted motor exercises. In an era of highly developed technology, it is extremely important not to forget to encourage children to engage in any physical activity, sports, or free play in the fresh air. Well-established foundations in childhood and the acquisition of healthy habits, both physical and dietary, can be applied by children into adulthood. Childhood is a crucial and irreplaceable period, and parents and educators should be aware of their significant role in shaping it.

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**Utjecaj sporta na motorički razvoj djece
predškolske dobi**

Sažetak

Uključivanje djece rane dobi u sport doprinosi njihovom fizičkom i psihičkom zdravlju. Motoričke sposobnosti koje dijete razvija tijekom djetinjstva uvelike utječu na njegove sposobnosti u daljnjem životu. Iako je poznato da je tjelesna aktivnost jedna od najvažnijih čimbenika za zdrav razvoj djece, neka istraživanja pokazuju da je sve više djece nedovoljno aktivno što rezultira pretilošću i brojnim drugim gubitcima za zdravlje. Iznimno je bitno educirati roditelje i odgojitelje o važnosti sporta, na koji način on pridonosi boljoj kvaliteti života te koje sve benefite djeca ostvaruju baveći se nekom tjelesnom aktivnošću odnosno sportom. Stoga je cilj ovoga istraživanja bio utvrditi aktualno stanje motoričkih sposobnosti djece predškolske dobi te postoji li razlika u motoričkim sposobnostima djece koja se bave sportom i one djece koja se ne bave ni jednim sportom. U istraživanju je sudjelovalo 40 djece jednoga zagrebačkog dječjeg vrtića, u dobi od 5 do 6,5 godina. Unutar istraživanja postavljena je afirmativna hipoteza koja pokazuje da postoji razlika u motoričkim sposobnostima između predškolske djece koja se bave i koja se ne bave sportom u korist djece koja treniraju neki sport. Ova hipoteza djelomično je potvrđena zbog toga što su djeca sportaši pokazali bolje motoričke sposobnosti u 4 mjerene varijable, a to su: poligon natraške, trbušnjaci u 30 sekundi, skok u dalj iz mjesta te taping rukom. U dvije mjerene varijable rezultati pokazuju da nema statistički značajne razlike između sportaša i nesportaša, a to su: stajanje na jednoj nozi na kocki i pretklon trupa. Iako je u dvije mjerene varijable pokazano da statistički nema velike razlike između sportaša i nesportaša rezultati su ipak bili bolji kod sportaša što dokazuje da sport nedvojbeno utječe na motoričke sposobnosti djece te da bi odrasli trebali poticati djecu kada je god to moguće da se uključe u sportsku ili na bilo kakvu tjelesnu aktivnost.

Ključne riječi

kvaliteta života; motoričke sposobnosti; podrška roditelja

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