

IMPACT OF JUDO ON THE KINANTROPOLOGICAL CHARACTERISTICS OF EARLY SCHOOL-AGE PUPILS

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Original research:

Abstract

The aim of this paper is to determine the impact of practicing judo elements in PE classes on the improvement of kinanthropological characteristics (morphological characteristics, motor and functional abilities) of students between the ages of 8 and 9, who were enrolled in the program.

Material and methods.: The research included 22 (10 male and 12 female) students from grade 2a, who formed the experimental group, and 23 (11 male and 12 female) students from grade 2b, who made up the control group of the Pehlin Elementary School in Rijeka in the academic year 2018/2019. During the research, the initial measurement was made at the beginning of the program and the final measurement after three and a half months.

Results.: The results obtained through comparison between the experimental and control group in the final measurement indicate statistically significant differences between the two groups in the following tests: standing long jump ($p = 0.01$); sit-ups ($p = 0.03$); 3-minute run ($p = 0.04$).

Conclusion.: Although the students of the experimental group statistically progressed in three motor abilities (explosive leg strength, flexibility, and the speed of alternative movements) and functional abilities

Keywords: children, judo, kinanthropological characteristics, differences

Introduction

All segments of kinanthropological characteristics are of immense importance because their monitoring is fundamental to their development and guidance. These are organized systems of all abilities, traits, and motor information and their interrelations (Prskalo, 2004). Kinanthropological characteristics consist of motor and functional abilities as well as morphological characteristics, and they are ultimately the indicators of a healthy lifestyle and sports activity. Some segments of kinanthropological characteristics can be influenced to a greater extent with regular exercise while some to a lesser because they are conditioned by genetics. Unfortunately, some children engage in physical activity solely in Physical Education (PE) classes, so it is important to carry out such classes as adequately as possible. The indisputable importance of exercise and a healthy lifestyle is evidenced by the fact that sport is a genomic activity

rooted in the “pre-instinct” to act, and action itself is a genome. Therefore, as birds have to fly, lions run, so people need to move (Lukić, 2004). Studies conducted worldwide have shown that regular physical activity undoubtedly improves human health and prevents a range of diseases (Neljak, 2011). As it is necessary to eat daily, it is necessary to exercise at a lower or higher intensity on a daily basis, depending on the exercise goals and the age of the individual (Metikoš et al. 1994). Therefore, the primary purpose of PE is to encourage the proper development of kinanthropological as well as other anthropological characteristics of children and young people as a foundation for their health (Neljak, 2011). Muscle activity is most important in the early stages of development, i.e., in childhood, when it can affect the physical development with activity, but also the formation of healthy lifestyle habits (Prskalo, 2004). A higher quality curriculum implementation, an appropriate monitoring, and verification system, and the introduction of new

content results in greater interest and later the students' habit of exercising (Neljak, 2011).

One of the sports in which early school-age children can develop useful kinanthropological characteristics for life is judo.

Judo is a sport that originates in Japan and belongs to the martial arts as well as Olympic sports. Judo was founded in 1882 by Japanese professor Jigoro Kano for the reason that, as a skinny, short boy, he was often bullied in elementary and high school. He decided to design a sport with the help of which a shorter and more delicate person would be able to defeat a larger and heavier person, thereby using their own energy against the bully (Matsumoto, 1996). He called the sport JU-DO, which in translation means a gentle way or a gentle path. All the techniques he devised for the sport were based on the principle of "give way to ultimately win" or "when the opponent is on the attack, or when pushing or pulling, throw him on the ground to use their energy." Judo was soon introduced to Japanese schools, universities, police, and military (Bradić, 2012). Judo gradually evolved into a

competitive sport. As early as 1964, it was declared an Olympic sport and it can be said with certainty that today there is no country in the world where judo is not practiced (Parčina, 2002).

The impact of judo on the improvement of motor skills of children between the ages of nine to 11, who participated in the program for nine months, was confirmed by Vidranski et al. (2007).

Since the sport of judo is not represented in PE during classroom teaching, we consider it important to introduce it with appropriate contents.

The aim of this paper is to determine the impact of practicing judo elements in PE classes on the improvement of kinanthropological characteristics (morphological characteristics, motor and functional abilities) of students between the ages of 8 and 9, who were enrolled in the program.

To this end, the data obtained from the initial and final monitoring of the experimental group that participated in the judo program and the control groups over a period of three and a half months were processed and analyzed.

Methods of research

The sample consisted of students enrolled in grades 2a and 2b of the Pehlin Elementary School in Rijeka. The research included 22 (10 male and 12 female) students from grade 2a, who formed the experimental group, and 23 (11 male and 12 female) students from grade 2b, who made up the control group. During the research, the initial measurement was made at the beginning of the program and the final measurement after three and a half months.

The sample of variables consisted of 11 variables for assessing the kinanthropological characteristics used in the education system (Pejčić i Trajkovski, 2018), starting with tests for motor skills: sit-ups (MPT), standing long jump (MSD), seated forward bend (MPR), hand-tapping (MTR), polygon backwards (MPN), and bent arm hang (MIV) and one test to assess the functional ability of 3-minute run (F3). Also, the sample consisted of measurements of anthropometric characteristics, i.e., body weight (ATT), body height (ATV), upper arm skinfold (ANN), and body mass index (BMI) assessment.

Descriptive parameters were calculated for data processing: arithmetic mean, standard deviation, and minimum and maximum results. The t-test for independent samples was used because of the need to determine the differences between the groups in the initial and final measurements. The t-test for dependent samples determined differences between the initial and final intra-group measurements.

Results and discussion

Table 1 shows the results of the kinanthropological characteristics of the experimental and control group in the initial and final measurements and the results of the T-test for dependent samples, which determined differences in the kinanthropological characteristics between the initial and final measurements within the experimental and control group and the results of the t-test for the independent samples, i.e., differences in the kinanthropological characteristics were determined between the groups in the initial and final measurements.

The experimental group made a statistically significant improvement in the period between the initial and final measurement in the following tests: height ($p = 0.001$): the students grew two centimeters between the initial and final measurements; hand-tapping ($p = 0.02$): the control group students achieved 22 strokes in the initial and 23 in the final measurement; standing long jump ($p = 0.03$): the students jumped 136.65 cm on average in the initial and 147.7 cm in the final measurement; seated forward bend ($p = 0.04$): the students had an average score of 62.7 cm in the initial and 64.2 cm in the final measurement; 3-minute run (p

= 0.000): the students ran 450.55 m in three minutes in the initial and 494 m in the final measurement.

Table 1. Descriptive indicators of the kinanthropological characteristics of the experimental and control group and their differences (AS = arithmetic mean; SD = standard deviation; p = level of significance within a group and between the groups)

Test	Measurement	Experimental (AS±SD)	Control (AS±SD)	p
ATV	I.	1.34 ±0.06	1.36±0.08	0.43
	F.	1.36 ±0.06	1.38±0.08	0.35
	p	0.001	0.48	
ATT	I.	32.8 ±8.16	32.1±8.9	0.8
	F.	33.2 ±8.24	34.9±9.99	0.56
	p	0.46	0.00	
ANN	I.	9.5 ±3.08	9.73±2.79	0.78
	F.	9.2 ±2.5	9.75±3.21	0.68
	p	0.9	1	
BMI	I.	18.23 ±4.3	17.43±4.81	0.58
	F.	17.8 ±4.03	18.1±3.45	0.91
	p	0.5	0.54	
MPN	I.	19.7 ±7.9	19.72±7.07	0.99
	F.	19.5 ±3.8	20.43±5.3	0.65
	p	0.37	0.9	
MTR	I.	22.4 ±3.56	20.43±2.85	0.12
	F.	23.2 ±3.25	22.7±2.43	0.62
	p	0.02	0.09	
MSD	I.	136.7 ±23.3	122.4±14.3	0.03
	F.	147.7 ±28.9	128.2±17.5	0.01
	p	0.03	0.35	
MIV	I.	15.9 ±17.3	22.4±14.8	0.24
	F.	16.05 ±17.2	14.4±10.96	0.71
	p	0.86	0.14	
MPR	I.	62.7 ±14.9	53.3±18.3	0.09
	F.	64.2 ±14.6	68.6±17.5	0.4
	p	0.04	0.03	
MPT	I.	32.6 ±7.3	25.8±6.8	0.00
	F.	36.2 ±7.9	30.5±7.8	0.03
	p	0.24	0.14	
F3	I.	450.6 ±59.6	540.5±69.32	0.00
	F.	494.0 ±75.9	446.1±70.81	0.04
	p	0.00	0.00	

The results of the t-test for the dependent samples, i.e., the comparison of the initial and final measurement in the control sample point to statistically significant changes in three tests, but in some segments they are negative. Such statistically significant changes are observed in the measurements of weight: the students gained two kilos; flexibility: the students advanced from 53.28 cm to 67.94 cm; while in the running test, the results of the final measurement were worse than in the initial measurement; the students ran 540.53 m in 3 minutes in the initial and 445.26 m in the final measurement.

The results obtained may well indicate that major changes in the kinanthropological characteristics occurred only in the experimental group, which practiced the elements of the judo technique for a period of three and a half months, and it can be concluded that judo in PE helps to develop and improve the health of students because, certainly, by practicing judo techniques, functional abilities are improved in addition to greater strength. On the other hand, the opposite happened in the control group. In fact, stagnation of motor and functional abilities, except flexibility, which can be attributed coincidence, and weight gain are of concern for children as young as eight years old. For this reason, such PE content should be designed that helps combat obesity as well as contributes to an increase in strength and muscular endurance.

The results of the t-test for the independent samples, which tested for differences between the experimental and control groups in the initial measurement, indicated that there were significant differences between the groups in the following tests: standing long jump (p = 0.03): the experimental group jumped 136.65 cm and the control group 122.37 cm; sit-ups (p = 0.00): the experimental group had an average of 32 sit-ups, while the control group had 25; 3-minute run test (p = 0.00): the experimental group achieved a poorer result with a score of 450.55 m, while the control group managed to run 540.5 m in three minutes.

The results obtained through comparison between the experimental and control group in the final measurement indicate statistically significant differences between the two groups in the following tests: standing long jump (p = 0.01): the experimental group achieved an average score of 147.7 cm while the control group achieved a score of 128.15 cm; sit-ups (p = 0.03): the experimental group did 36 sit-ups and the control group 30 sit-ups; 3-minute run (p = 0.04): the experimental group achieved a score of 494 m in three minutes while the control group achieved 446 m, and the control group achieved a far worse result in this test than in the initial test state, i.e., they showed a significant decline in the expression of aerobic ability.

Conclusion

Although the students of the experimental group statistically progressed in three motor abilities (explosive leg strength, flexibility, and the speed of alternative movements) and functional abilities (F3), the progress could have been even greater had the judo training been implemented more frequently, had the research been conducted over a longer period, and had

the students participated in classes more regularly (they were often absent from school due to illness) given that regularity of participation is very important since judo is a complex sport). Often, judo games were used to learn and practice new judo elements as it was noticed that this facilitated the children's motivation and desire to learn. Although this study has shown that judo exercise is very useful for developing kinanthropological characteristics of the students in classroom teaching, additional teacher education is required for teachers to become familiar with judo techniques in order for them to be able to implement them in PE instruction.

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Submitted: 13.12.2019.

Accepted: 11.02.2020.