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DIFFERENCES IN MOTOR ABILITIES BETWEEN COMPETITIVE AND RECREATIONAL KARATE PRACTITIONERS AT ADOLESCENT AGE

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Miloš Grubješić¹

International School, Belgrade, Serbia

Ognjen Stanković

Training Studio „Akademik VGSK“, Veliko Gradište, Serbia

Abstract: Motor skills as a characteristics involved in solving motor tasks are not equally developed in every individual, whether he or she is an athlete, recreational athlete or is not engaged in physical activity. The aim of this study was to determine the differences in motor skills of adolescents engaged in karate, but at different volume and intensity. The sample consisted of 30 karate practitioners aged 14 and 15, divided into two groups of 15 players. A battery of seven tests was used to assess their motor skills. In statistical data processing, descriptive statistical analysis and the Mann Whitney U test were applied to determine the difference between groups at the level of statistical significance $p < 0.05$. Research has shown that competitive karate practitioners performed better in the tests of explosiveness, repetitive power, endurance, speed and agility. Statistically significant differences in these tests were expected as competitors dedicated more time to training strength, explosiveness and endurance. There were no statistically significant differences in the tests of flexibility and balance, which was partially expected because of the nature of the sport the respondents are engaged in.

Key words: *motor skills, karate practitioners, competitive karate practitioners, recreational karate practitioners.*

¹ ✉ grubi_g@hotmail.com

INTRODUCTION

According to the World Health Organization, health is defined as a state of complete physical, mental, moral and social well-being (Džinović, 2011). Such an interpretation of the notion of health places the role of physical activity as the basis for the formation of a healthy lifestyle.

Increased exercise intensity has a positive effect on physical development and the development of physical abilities. There is a direct correlation between health and exercise, adequate exercise influences health and health influences adequate exercise. Physical activity includes a wide range of activities, from professional, recreational, daily routines - housework to physical work in the garden and the like. Such activities may require light, moderate, or intense effort and may have the effect on improving health if performed regularly (Gadzic, 2019). Dynamic physical activity promotes proper growth and body development, provides optimization of mechanical and physiological conditions for the functioning of the locomotor apparatus, helps maintain general psychophysical state and proper posture, contributes to the prevention of injuries, etc. (Gadzic, 2016).

This research is an attempt to determine whether and to what extent the number and intensity of training sessions affect the status of motor skills in karate practitioners aged 14 and 15.

Martial arts, as a form of physical exercise, are in addition to gymnastics, athletics and swimming classified as basic sports that children should practice at an early age. Karate as such develops focus, coordination and discipline in children (Jovanovic, Cirkovic, and Kasum, 2010).

METHOD

Sample

The sample consisted of 30 male karate practitioners of the Sunce Sports and Recreation Club, aged 14 and 15. The respondents were divided into two groups, recreational karate practitioners and competitive karate practitioners.

Recreational karate practitioners trained three times a week in moderate intensity. The aim of their training is to advance through the belts, which means that they stand before a commission once a year to show what they have learned in a year's time. That is why most of their training is about learning the next belt programme, or karate rank programme.

Competitive karate practitioners had five to six training sessions a week, they took exams to get higher rank belts just like recreational athletes, but also regularly participated in winter and summer preparations, as well as ten to twenty tournaments a year, and their training is aimed at achieving the best possible competitive results. As a result, their training is more intense,

more extensive and the accent is on specific karate techniques that are much more demanding than a "regular" karate program.

Variables

The survey used the Eurofit battery of tests (Eurofit, 1993), which consisted of seven tests:

- Flamingo balance test
- Plate Tapping
- Sit-and-Reach
- Standing Long Jump
- Flexed Arm Hang
- Sit-Ups for 30 seconds
- 20m endurance shuttle-run test

Data processing method

For all the variables, the following parameters were calculated: arithmetic mean, standard deviation, minimum value, maximum value and range.

Because of the small number of respondents on the basis of which normal distribution cannot be expected, the Mann-Whitney U test was used as a nonparametric statistics test to determine the difference between the groups of respondents.

The aim of the research is to determine the potential differences between competitive and recreational karate practitioners in terms of the selected motor skills.

RESULTS

Table 1. *Descriptive indicators of recreational karate practitioners' variables*

Variables	N	Range	Min	Max	Mean	SD
Flamingo balance test	15	2.00	1.00	3.00	1.53	0.64
Sit-and-Reach	15	22.00	19.00	41.00	26.67	5.94
Standing Long Jump	15	60.00	150.00	210.00	171.87	17.74
Sit-Ups for 30 seconds	15	11.00	12.00	23.00	18.67	3.68
Flexed Arm Hang	15	43.30	1.89	45.19	11.35	10.73
Plate Tapping	15	3.91	11.22	15.13	13.55	1.08
20m endurance shuttle-run test	15	6.00	16.47	22.47	19.62	1.42

Table 2. *Descriptive indicators of competitive karate practitioners' variables*

Variables	N	Range	Min	Max	Mean	SD
Flamingo balance test	15	2.00	1.00	3.00	1.33	0.62
Sit-and-Reach	15	20.00	20.00	40.00	28.60	6.01
Standing Long Jump	15	32.00	188.00	220.00	206.67	9.46
Sit-Ups for 30 seconds	15	10.00	23.00	33.00	27.93	3.51
Flexed Arm Hang	15	48.83	14.41	63.24	37.97	14.38
Plate Tapping	15	3.60	9.82	13.42	11.38	1.11
20m endurance shuttle-run test	15	3.34	15.41	18.75	17.16	0.96

The results obtained from Tables 1 and 2 were analyzed comparatively for each variable separately. The analysis of the results obtained in the Flamingo test reveals that the minimum, maximum value and range are identical in the total sample and in both groups; however, differences are observed in the arithmetic mean values (differences of 0.2) and standard deviations (0.02). For the Sit-and-Reach variable, the highest score was achieved by a respondent from the recreational practitioners' group; the differences between the maximum and minimum values, as well as the distribution range and standard deviation, have no major deviations from the average, not even between groups. Looking at the arithmetic mean, the competitors group achieved better results. Standing Long Jump shows great differences in the achieved results, the arithmetic means of the two groups differ by 35 centimeters in favor of the competitors, the maximum value differs by 10 cm and the minimum by 38 cm. On average, the highest number of recreational players achieved a score which is below the worst result in the competitors group. For the 30-second Sit-Ups variable, the arithmetic mean of the recreational and competitors group differs by 11 and the maximum and minimum by about 10. The test of static endurance of the shoulder and arm muscles shows quite significant differences between the results achieved by different groups. The arithmetic mean of recreational and competitors group differs by 26 seconds, the maximum value differs by 22 seconds, and the minimum by 13. The plate tapping test showed that the competitors achieved much better results, which is evidenced by the fact that on average the highest number of recreational players achieved a result that can be compared to the worst score of the competitors group. In the test of running speed and agility of the respondents, the highest number of competitors achieved a score between 16 and 18 seconds, while the highest

number of respondents in the recreational group took between 18 and 20 seconds, indicating that the competitors achieved better results.

Table 3. Results of Mann-Whitney U test of motor skills – competitive karate practitioners' group and recreational karate practitioners' group

Variables	Mann-Whitney U	Z	p	Mean rank	
				Recreational Practitioners	Competitors
Flamingo balance test	91.500	-1.03	0.30	16.90	14.10
Sit-and-Reach	92.000	-0.86	0.39	14.13	16.87
Standing Long Jump	12.000	-4.17	0.01	8.80	22.20
Sit-Ups for 30 seconds	1.000	-4.64	0.01	8.07	22.93
Flexed Arm Hang	15.000	-4.04	0.01	9.00	22.00
Plate Tapping	19.500	-3.86	0.01	21.70	9.30
20m endurance shuttle-run test	13.000	-4.13	0.01	22.13	8.87

In the Mann-Whitney U test, competitive karate practitioners achieved statistically significantly better results on five of the seven motor tests: Standing Long Jump, Sit-Ups for 30 seconds, Flexed Arm Hang, Plate Tapping and 20m endurance shuttle-run test. Despite lower mean rankings of the competitors in the two tests (Plate Tapping and 20m endurance shuttle-run test), the results of the competitors are better than the results of the recreational group because in these tests it is necessary to perform a motor task for a shorter time, so a smaller numerical value means a better result. Statistically significant differences in these tests were partially expected as competitors dedicate more time to training strength, explosiveness and endurance.

DISCUSSION

This research has been conducted to examine differences in karate practitioners whose karate training varies in intensity, scope and content. There is a large body of research in the research literature aimed at examining differences in motor skills in persons engaged in an organized physical activity and persons not engaged in the same physical activity (Batričević, 2008; Ivanović and Ivanović, 2012; Zarić, 2014; Badrić, Sporiš, Krestičević, 2015).

This also applies to karate and other martial arts (Simonovic et al., 2011; Tatar and Cupic, 2011; Vukovic, Obradovic, Djuric, and Mudric 2013; Matic, Kandic, Panic, Gavrilovic, 2017; Bojanic, Bojanic, Gadzic and Milosavljevic, 2018). On the other hand, there are significantly fewer studies dedicated to the level of motor skills of athletes of different levels of involvement in a sport. In some of these studies, which are related to sports karate, the authors concluded that the selected karate practitioners achieve better results in specific motor tests due to the high level of basic motor skills (Vujkov, 2015).

In an attempt to identify the "motor structure" that determines competitive performance in karate, the authors identified three main factors in the sample of competitive and recreational karate practitioners in which the two categories of karate practitioners differed: coordination, explosive power and movement frequency (Blažević, Katić, Popović, 2006). Previous research on a sample of elite-ranked competitive karate practitioners (international competition level) shows that elite karate practitioners differ from lower-ranking karate practitioners (national competition rank) in terms of explosive lower extremity power, maximum power, and maximum speed (Chaabène et al., 2012). The results of the current research also support this finding, because competitive karate practitioners performed better in tests for estimating explosive power (Standing Long Jump), movement frequency speed (Plate Tapping) and running speed - agility (20m endurance shuttle-run test) compared to the recreational karate group.

Earlier research on a sample of karate practitioners of similar age confirmed that the integration of defense and attack, that is, the ability to execute combinations of techniques in a series, is important for sports performance in karate, and that combat effectiveness is predominantly determined by specific speed and agility abilities (Katić et al., 2009). There are certain similarities to these findings in our study, since the competitive practitioners' group performed better on tests for assessing movement frequency speed (plate tapping), running speed and agility (20m endurance shuttle-run test), indicating that the training of the competitive karate practitioners' group significantly influenced the quality of these motor skills.

CONCLUSION

The results of this study, which was conducted with the aim of identifying potential differences between those who practice karate recreationally and for competitions in selected motor skills, showed that greater frequency and intensity of training influences the speed, strength and

explosiveness of karate practitioners, while balance and flexibility are similar in both groups of respondents.

The obtained results confirm the findings of several previous studies that more intensive karate training significantly contributes to the manifestation of motor skills, which largely influence the success in this sport.

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