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Physical fitness 11-12 years boys who train judo and those who do not practise sport

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Abstract

Background & Study Aim: The incessant technological progress and negative effects of environmental pollution which are felt more and more by an ordinary human being are the phenomena which have impact on the development of civilisation diseases. Judo by the authors of many publications is recommended as the optimal sport life for all. The aim of the study was the knowledge about overall physical fitness of school youth who train judo and who do not practice any sport.

Materials & Methods: The study group consisted of 44 boys 11-12 years old, including 22 persons who train judo (three times a week for 90 minutes each training session) and 22 boys who do not practice any sport. The Test of Physical Fitness (development by the International Committee on the Standardisation of Physical Fitness Test) was used in the study. Test results based on the score tables and were subjected to statistical calculations. An arithmetic mean, standard deviation, skewness, kurtosis and Student's t-test were calculated for independent samples.

Results: Boys who train judo do not exceed on the level statistically significant boys who do not practice any sport only in 3 tests: a run over a distance of 50 meters; a run over a distance of 600 meters (boys 11 years old, and 800 meters 12 years old); handgrip strength. The difference in results of the other 5 tests is significant ($p<0.0005$) on the plus side of judokas. Also, the average sum of the difference scors (judokas 517.45, boys who do not practice sport 452.91) is statistically significant ($p<0.01$). Among young judokas individual differences are much smaller. In the group of boys who do not practice sport three (13.64%) revealed very low levels of overall physical fitness (sum of scores 316 to 318).

Conclusion: Assuming that before the start of judo training both groups of boys did not differ significantly in terms of overall physical fitness and empirical data suggest that most stimulate these exercises: power and muscle strength, agility, flexibility. These features are cited as very important for the motor safety and the health positive of man throughout his life.

Key words: combat sports · life sport · motor safety · Test of Physical Fitness

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Motor safety is consciousness of the person undertaking to solve a motor task or consciousness the subject who has the right to encourage and even enforce from this person that would perform the motor activity, who is able to do it without the risk of the loss of life, injuries or other adverse health effects [10]

Effort safety is consciousness of the person who starts physical effort or consciousness of the subject who has the right to encourage or even enforce from this person the physical effort of a certain intensity and duration, who it is able to do so without risking life or health [10].

INTRODUCTION

The incessant technological progress and negative effects of environmental pollution which are felt more and more by an ordinary human being are the phenomena which have impact on development of civilisation diseases, such as obesity and overweight, diabetes, cardiovascular diseases. The rapid development of civilisation and low awareness of the society results in growing number of overweight people.

Physical activity is one of the countermeasures. As stated by Kiełbasiewicz-Drozdowska [1], physical activity is essential to man in various stages of life and in all age groups. The meaning of physical activity changes and evolves along with person's age and always remains one of major factors affecting health. Physical activity is also an important determinant of physical fitness. The effect of physical activity is physical fitness: speed, strength, endurance, nimbleness and flexibility [2-10], but not only. Certain forms of physical activity have a significant impact on the development and maintenance of mental health and social health. The scientific work and health promotion are also not sufficiently emphasized issues motor safety and effort safety [10]

In accordance with the assumption of Jigoro Kano, the inventor of judo, training should have impact on development of physical fitness but also on intellectual and moral sphere [11, 12]. Jigoro Kano has also highlighted that safety of persons during training is the most important and therefore he eliminated from judo dangerous holds that pose risk to health.

The study focused on the judo (as sport discipline) as it draws attention to comprehensive preparation of a competitor and to the fact that all locomotor skills related to condition and coordination are taken into account during training [13-18].

It is a truism to emphasize that the youth who trains sports with high energy expenditure exceeds the physical fitness of their peers. People who train combat sports and martial arts also gain the ability to self-defence and many other benefits. But still the easiest way (also safe) compare the effects of training with people practicing sports are not recommended test results of physical fitness [4, 6, 9, 19, 20].

The aim of the study was the knowledge about overall physical fitness of school youth who train judo and who do not practice any sport.

MATERIALS AND METHODS

Participants

The study group consisted of 44 boys 11-12 years old, including 22 persons who train judo 4 years and 22 boys who do not practice any sport. The study group consisted of 44 boys 11-12 years old, including 22 persons who train judo 4 years and 22 boys who do not practice any sport. The young judo athletes group practice that combat sport in clubs in Wrocław, Poland (three times a week for 90 minutes each training session). Physical activity boys from second group (formed by boys from elementary school) was limited to daily activities and physical education classes. The age of boys studied was 11-12 years. Local bioethical commission has given consent to the study.

Protocol

The Test of Physical Fitness (development by the International Committee on the Standardisation of Physical Fitness Test: ICSPFT) was used in the study [21]. The study was conducted in February and March 2015. The test consists of 8 attempts whose results after being calculated and summed up provided information about physical fitness.

The attempts were conducted for 2 days. During the first day, three attempts were performed: (1) *50 m dash* (result: the time of better run out of two ones is measured with an accuracy of 0.10 seconds), (2) *standing broad jump* (result: jump length in cm), (3) *long run* (result: time with an accuracy of 1 second).

The remaining 5 attempts were conducted on the second day: (4) *handgrip* (result: strength is noted with an accuracy of 1 kilogram), (5) *bent arm hang* (result: chin over the bar), (6) *4x10 m shuttle run* (result: the time from the start, in which the second block is placed in a semi-circle is measured with an accuracy of 1/10 second), (7) *sit ups* (result: number of sit-ups performed in 30 seconds), (8) *bend trunk* (result: it is constituted by deeper bend obtained in two consecutive attempts and measured in cm).

After converting raw results (cm, s, kG) into points according to the relevant table and adding points, the total assessment of the physical fitness of individuals or group of individuals is obtained [21]. This total assessment can be applied to the classification standards and on this basis used to assess physical fitness.

Classification standards for three levels of physical fitness (accepted by us arbitrarily), regardless of sex and age group are as follows: high fitness: 481 points

Table 1. Results of the Test of Physical Fitness (in units of measurement)

Attempts of the Test of Physical Fitness [unit of measure]	Practicing judo (n = 22)				Not practise sport (n = 22)				
	X	SD	min	max	X	SD	min	max	p
(1) 50 m dash [s]	**6.65**	0.48	6.00	7.8	**7.23**	0.93	6.17	9.0	
(2) standing broad jump [cm]	**203.59**	23.07	160	230	**162.73**	20.26	135.00	205.00	**0.0005**
(3) long run [s]	**107.25**	24.8	92	139	**129**	14.7	95	178	
(4) handgrip [kG]	**30.95**	6.86	12.00	44.00	**28.55**	6.01	19.00	40.00	
(5) bent arm hang [s]	**26.63**	11.47	3	47	**12.23**	11.45	0	41	**0.0005**
(6) 4x10 m shuttle run [s]	**10.44**	0.64	9.8	10.7	**11.83**	0.97	10	14	**0.0005**
(7) sit ups [number of repetitions]	**25.61**	5.83	18	35	**22.36**	5.13	15	33	**0.0005**
(8) bend trunk	**–7.5**	6.38	15	10	**1.59**	7.12	11	24	**0.0005**

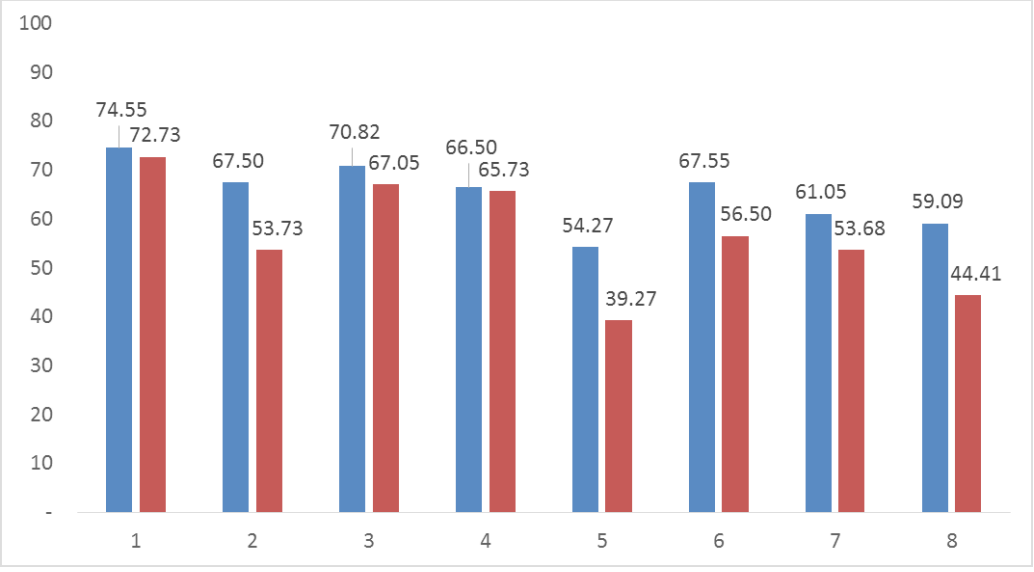

Figure 1. Similarities and differences in the physical fitness of 11-12 year old boys practicing judo (n = 22, blue) and not practise sport (n = 22, yellow) – results in score tables.

and more; moderate fitness: from 320 to 480 points low fitness: 319 points and less.

Statistical analysis

We calculated arithmetic means, standard deviations, range (minimum and maximum values) and range of the analysed empirical variables, skewness (g_1) and kurtosis (g_2) kurtosis. In order to determine the significance of the differences between the two means (results judo athletes and not practise sport boys), at test for independent samples was used. We defined the significance of the difference between two proportions independent.

RESULTS

Significant differences ($p<0.0005$) were noted in (test number in parentheses): power (2), muscular strength (5, 7), nimbleness (6), flexibility (8) (Table 1, Figure 1). Boys who train judo are more physically. Smaller is also the interindividual variation of the young judokas, as evidenced by comparing the rates of variation, standard deviation and range (Table 1, 2 and 3).

Legend: (1) 50 m dash; (2) standing broad jump; (3) long run; (4) handgrip; (5) bent arm hang; (6) 4x10 m shuttle run; (7) sit ups; (8) bend trunk.

Table 2. Results the Test of Physical Fitness (in score tables) of 11-12 year old boys practicing judo (n = 22)

Statistic indicator	Attempts of the Test of Physical Fitness (points on a scale of 1 to 100)								Total points
	(1) 50 m dash	(2) standing broad jump	(3) long run	(4) handgrip	(5) bent arm hang	(6) 4x10 m shuttle run	(7) sit ups	(8) bend trunk	
X	**74.55**	**67.50**	**70.82**	**66.50**	**54.27**	**67.55**	**61.05**	**59.09**	**517.45**
SD	7.56	8.39	8.67	10.57	11.86	6.12	9.13	8.91	48.90
min	56	52	56	36	26	50	40	33	419
max	87	80	88	80	69	75	74	70	581
g1	–0.80	–0.37	0.44	–1.20	–1.25	–1.26	–0.57	–1.33	–0.59
g2	0.69	–0.75	–0.51	1.99	0.60	2.18	–0.03	2.03	–0.78

Table 3. The Test of Physical Fitness results (in score tables) of 11-12 year old boys who do not practise sport (n = 22)

Statistic indicator	Attempts of the Test of Physical Fitness (points on a scale of 1 to 100)							Total points
	(1) 50 m dash	(2) standing broad jump	(3) long run	(4) handgrip	(5) bent arm hang	(6) 4x10 m shuttle run	(7) sit ups	(8) bend trunk	
X	**72.73**	**53.73**	**67.05**	**65.73**	**39.27**	**56.50**	**53.68**	**44.41**	**452.91**
SD	12.66	10.23	14.69	13.48	14.33	9.82	16.62	12.07	70.35
min	41	36	40	40	22	36	34	10	316
max	94	75	89	94	61	73	99	66	541
g1	–0.89	0.61	–0.42	–0.03	0.25	–0.43	1.30	–0.85	–0.75
g2	0.50	–0.29	–0.53	0.20	–1.47	–0.25	1.43	1.93	0.17

Among young judokas dominate high levels of physical fitness (63.63%) but the difference proportion of boys who do not practice sport is not statistically significant (Table 4). Nobody was in a low range. However 36.36% of boys who do not train any sport is at high level which should also be considered as a very good result. In the non-training group 11 persons (which constitutes half of the entire group of children) from elementary school revealed an moderate level of physical fitness. In the group of children who do not train, there are 3 people at low level which constitutes 13.64% of all non-training people.

DISCUSSION

conducted study allows to determine that differences in physical fitness in boys aged 11-12 years training judo and those who do not train judo are substantial. Fitness in training group is high and moderate. The level of fitness of untrained peers is high, moderate or low. It may be stated that novice training stage is the most beneficial for developing coordination, speed and nimbleness in young judokas. The empirical evidence confirms the opinion that judo training has effect on optimal development of young organism as the exercises always take place with a partner and such situation forces threshold loads of all human locomotor, vegetative and mental systems. Specific exercises judo (technique) stimulate the growth of muscle strength and anaerobic of endurance, nimbleness, flexibility.

Moreover, training judo in Poland for children consists of many games and plays. Many professionals on the one hand promotes the implementation of elements of judo to the practice of sport for all and physical education [8, 14, 22-24], on the other hand, fun forms of martial arts training also different combat sports [25-27]. Similar methodological approach presented judo experts from France, Russia and Spain [13, 28-10].

There are very few research works based on the physical fitness of young judo athletes using ICSPFT.

Table 4. Comparison of the fitness level of both tested groups.

Tested groups and statistic indicator	Fitness level					
	high		moderate		low	
	n	%	n	%	n	%
practicing judo (n = 22)	**14**	63.63	**8**	37.37	**-**	-
not practise sport (n = 22)	**8**	36.36	**11**	50	**3**	13.64
difference between two proportions independent (p)	1.811		0.914		-	

The results of our study can be reliably compared with 6-years (1996-2001) observations Jagiełło et al. [31-33] young judo athletes (n = 224) from the same population (Wrocław). Observed by us 11-12 years old judokas (results in Table 1 are for an average age of 11-12 years) are faster than surveyed by Jagiełło et al. [31], as evidenced by the result of attempt: *50 m dash*, respectively: mean **6.65** s ±0.48, min 6.0 s, max 7.8 s 11 years old (n = 50) mean **8.69** s ±1.43, min 6.1 s, max11.5 s, 12 years old (n = 38) mean **8.52** s ±1.26, min 6.0 s, max11.0 s.

Similarly better are power indicators (attempt: *standing broad jump*) judokas examined by us: mean **203.59** cm ±23.07, min 160 cm, max 230.0 cm, Jagiełło et al. [32] 11 years old, mean **177.58** cm ±32.0, min 110.0 cm, max 221.5 cm; 12 years old, mean **190.05** cm ±30.5, min 105.0 cm, max 230.0 cm. Also indicators of muscular strength. Attempt *hand-grip*, result of our studies: mean **30.95** kG±6.86, min 12.0 kG max 44.0 kG, Jagiełło et al. [32] 11 years old, mean **25.33**kG ±7.16, min 11.5 kG, max 38 kG; 12 years old, mean **28.55** kG ±7.7, min 10.0 kG, max 42.0 kG. However the result attempt *sit ups* in our studies is similar to 11 years old judokas analysed by Jagiełło et al. [32]. The results of our studies: mean **26.61** number ±5.83, min 11 number, max 35 number. Jagiełło et al. [32] 11 years old: mean **25.16** number ±8.4, min 11 number, max 37 number; 12 years old, mean **28.55** kG ±8.3, min 8number, max 38 number.

Although Jagiełło et al. in three publications [31-33] comprehensively analyse studies results against peer group, it does not refer to the results points. Compared the results with a control group consisted of over 200 000 children of school age not engaged in sport activities (1979-1989). Results publish by Trześniowski and Pilicz [32]. In our study, the control group were peers judokas only from Wrocław.

In a study of young people and adults concerning predicting success in combat sports and self-defence authors associate the results of the test fights (in groups consisting of 3-, 4- i 5-person in vertical posture and horizontal posture with selected attempts of ICSPFT [35]. In a study of youth 7 to 13 years four attempts: *standing broad jump*, *bent arm hang*, *sit ups*, *4 x 10 m shuttle run*. Correlated aggregated results ICSPFT (expressed in points) with the results of these fights. Low and average correlation of results ICSPFT with test results of fights does not mean that the success in the fight judo is not deciding physical fitness. On the contrary, physical fitness is a very important factor. The problem concerns the accurate selection of tests, based on we can predict the future sports success [36, 37].

CONCLUSIONS

Assuming that before the start of judo training both groups of boys did not differ significantly in terms of overall physical fitness and empirical data suggest that most stimulate these exercises: power and muscle strength, agility, flexibility. These features are cited as very important for the motor safety and the health positive of man throughout his life.

COMPETING INTERESTS

Authors declare no conflicts of interest.

REFERENCES

1. Kiełbasiewicz–Drozdowska I, Siwiński W, editors. Teoria i metodyka rekreacji. Zagadnienia podstawowe. Akademia Wychowania Fizycznego. Poznań; 2001: 53 [in Polish]
2. Lester M, Sheffield LT, Trammell P et al. The effect of age and athletic training on the maximal heart rate during muscular exercise. Am Heart J 1968; 76(3): 370-6
3. Pate RR, Pratt M, Blair SN. Physical activity and public health. A recommendation from the Centers for Disease Control and Prevention and the American College of Sports Medicine. JAMA 1995; 273: 402-7
4. Fletcher GF, Balady G, Blair SN, et al. Statement on exercise: benefits and recommendations for physical activity programs for all Americans. A statement for health professional by the Committee on Exercise and Cardiac Rehabilitation of the Council on Clinical Cardiology, American Heart Association. Circulation 1996; 94(4): 857-862
5. Wołkow LW. Sportiwnaja podgotowka dietiej i podrostkow. Wieża. Kijev 1998 [in Russian]
6. Kuński H. Trening zdrowotny osób dorosłych. Poradnik lekarza i trenera. Agencja Wydawnicza Medsportpress. Warszawa. 2002 [in Polish]
7. Marcinkowski M, Sokołowski M. Aksjologiczne i funkcjonalne aspekty kultury fizycznej w wojsku. PTNKF. Warszawa; 2004: tom 7 [in Polish]
8. Jaskólski E, Wołkow L, Jagiełło W. Biologiczne i pedagogiczne podstawy systemu szkolenia sportowego. Centralny Ośrodek Sportu. Warszawa; 2005 [in Polish]
9. Heyward VH. Advanced fitness assessment and exercise prescription. 5th ed. Human Kinetics 2006
10. Kalina RM, Barczyński BJ. EKO-AGRO-FITNESS© original author continuous program of health-oriented and ecological education in the family, among friends or individually implemented – the premises and assumptions. Arch Budo 2010; 6(4): 179-184
11. Budō. The Martial Ways of Japan. Nippon Budokan Foundation; 2009
12. Jigoro Kano and the Kodokan. An Innovative Response to Modernisation. Compile by the Kanō Sensei Biographic Editorial Committee. Edited and Translated by Alex Bennett. Kōdōkan Judo Institute; 2009
13. Tumanian GS. Sportiwnaja borba, otbor i planirowanie. WiS Moskwa 1984 [in Russian]
14. Jaskólski E, editor. Judo jako środek działania w realizacji celów wychowania fizycznego. Akademia Wychowania Fizycznego we Wrocławiu Wrocław; 1987, [in Polish]
15. Matwiejew S, Jagiełło W. Judo trening sportowy. COS. Warszawa 1997 [in Polish]
16. Jagiełło W. Wieloletni trening judoków. COS. Warszawa 2000 [in Polish]
17. Laskowski R. Obciążenia treningowe a wydolność fizyczna kobiet trenujących judo. Gdańsk 2007; AWFiS [in Polish]
18. Sikorski W. Nauka praktyce judo. Polski Związek Judo. Warszawa; 2010 [in Polish]
19. Przewęda R, Dobosz J. Kondycja fizyczna polskiej młodzieży. Studia i Monografie 98. Akademia Wychowania Fizycznego. Warszawa; 2003 [in Polish]
20. Drabik J, editor. Pedagogiczna kontrola pozytywnych mierników zdrowia fizycznego. Akademia Wychowania Fizycznego i Sportu. Gdańsk; 2006
21. Pilicz S, Przewęda R, Dobosz J et al. Physical Fitness Score Tables of Polish Youth. Criteria for Measuring Aerobic Capacity by the Cooper Test. Studia i Monografie AWF. Warszawa 2002
22. Pustelnik J. Usprawnianie ruchowe dzieci poprzez wybrane element judo. Agencja Promotor-Lider. Warszawa 1995
23. Kalina RM, Jagiełło W. Zabawowe formy walki w wychowaniu fizycznym i treningu sportowym. Zeszyty Naukowo-Metodyczne. Wydawnictwa Akademii Wychowania Fizycznego. Warszawa 2000 [In Polish]
24. Kalina RM, Kruszewski A, Jagiełło W et al. Combat sports propedeutics – basics of judo. Wydawnictwa Akademii Wychowania Fizycznego. Warszawa 2003
25. Głaz A, Kuźmicki S. Gry i zabawy w treningu judo i zapasów. Kultura Fizyczna1981; 2 [in Polish]
26. Cieplicki M, Witkowski K. Judo. Zestaw ćwiczeń z wykorzystaniem skakanki i liny. Część I. Biblioteka „Życia Akademickiego", Wrocław 1999 [in Polish]
27. Jagiełło W, Kalina RM, Klimczak J et al. Fun forms of martial arts in positive enhancement of all dimensions of health and survival abilities. In: Kalina RM (ed.) Proceedings of the 1st World Congress on Health and Martial Arts in Interdisciplinary Approach, HMA 2015, 17–19 September 2015, Czestochowa, Poland. Warsaw: Archives of Budo; 2015: 32-39
28. Koblew JaK, Czermit KD, Rubanow MN. Podwiżnyje igry kak sredstwo podgotowki junych dzjudoistow. Sportiwnaja borba: Jeżegodnik, 1985: 25-27 [in Russian]
29. Szestakow WB, Jeregina SW. Teorija i metodika detsko-junoszeskogo dzjudo: uczebno-metodiczeskoje posobie. Moskwa OLMA Media Grupp, 2008. [in Russia]
30. Carratalá Deval S, Carratalá Sánches E. Judo. Ministerio de Educación, Cultura y Deporte. Madrit; the lack of year published [in Spanish]
31. Jagiełło W, Kalina RM, Tkaczuk W. Age peculiarities of speed and endurance development in young judo athletes. Biol Sport 2001; 18(4): 281-295
32. Jagiełło W, Kalina RM**,** Tkaczuk W. Development of strength abilities in children and youth Biology of Sport 2004; 21(4): 351-368
33. Jagiełło W, Kalina RM. Properties of Motor Development in Young Judokas. J Hum Kinet 2007; 17:113-120
34. Trześniowski R, Pilicz S. Tabele sprawności fizycznej młodzieży w wieku 7-19 lat. Akademia Wychowania Fizycznego. Warszawa; 1989 [in Polish]
35. Kalina RM, Chodała A, Dadeło S et al. Empirical basis for predicting success in combat sports and self-defence. Kinesiology 2005: 37(1): 1-13
36. Smulski W, Wolska B, Jagiełło W et al. The correlation of general and sport-specific preparation indices of elite female judo competitors with their age-somatic characteristics. Arch Budo 2011; 7(4): 239-245
37. Jagiełło W, Wolska B, Sawczyn S et al. The similarity of training experience and morphofunctional traits as prediction criteria of the sports level in subsequent stages of long-term women's judo training. Arch Budo 2014; 10: 201-210

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