

Original article

Comprehensive and special physical fitness of judo athletes of provincial national teams in the age groups: youngster (U16) and junior (U21)

Adam Prokopczyk 

Department of Defense Sports and Education, Faculty of Physical Culture Sciences, Eugeniusz Piasecki University School of Physical Education in Poznań, Poland, e-mail: prokopczyk@awf.poznan.pl

INFORMATION

Article history:

Submitted: 14 November 2019

Accepted: 25 August 2020

Published: 15 December 2021

ABSTRACT

The research aimed to determine the relationship between the universal and special physical fitness of judoists. The study involved players from the youngster (U16) and junior (U21) age group from provincial teams. The International Physical Fitness Test was used to measure comprehensive fitness, and the Special Judo Fitness Test was applied to assess special fitness. The research has shown that juniors exhibit a higher level of all-round (excluding flexibility) and special fitness than youngsters. More relationships between comprehensive physical fitness and special fitness were demonstrated in the youngster group. Leg muscle strength, endurance, agility, and abdominal strength were found to have the most significant impact on the overall level of all-round fitness in the youngster age group, while in the age group under 21, endurance, hand strength, and arm strength had the most significant impact. It has been shown that the combination of individual components of versatile fitness in a given training cycle may bring positive effects in shaping those features in both age groups. Besides, it has been shown that when taking account of the athlete's ontogenetic development and his/her sensitive period, the relationships between the components of comprehensive fitness and comprehensive and special fitness can significantly affect the effectiveness of the training process in both age groups.

KEYWORDS

judo, special physical fitness, comprehensive physical fitness, provincial team, junior



© 2021 by Author(s). This is an open access article under the Creative Commons Attribution International License (CC BY). <http://creativecommons.org/licenses/by/4.0/>

Introduction

Sports training in each sporting discipline is based on a multifaceted structure divided into two main components: the time and material structures. The time structure includes training stages (comprehensive, targeted, special) and the cycles in which the training process is carried out (macro-cycles, mesocycles, micro-cycles, training units). On the other hand, the material structure consists of agile, technical, tactical, mental, and theoretical (intellectual)

preparation [1]. Sports training should be conducted by a specialist, i.e., a trainer able to properly plan, organize, and implement it to lead the athlete to full development and achieving the highest results [2].

Each planned sports training process assumes the achievement, implementation of a goal assumed at its beginning (and which may change during its duration). Real planning of achievements is favored by knowing as many variables as possible, influencing the athlete's level at a specific sports level. That requires, among other things, the knowledge and proper use of tools that enable the assessment and analysis of changes in individual training components, which should provide feedback for the trainer on the effectiveness of the actions taken. One of the essential elements is the level of all-around fitness necessary in every sports discipline, and special fitness dedicated to a specific sport, which gives information about preparation for sports competition [3]. Importantly, training of both comprehensive and special physical fitness in combat sports should be assigned a unique role, as it is one of the factors determining the effectiveness of techniques performed in combat sports [4].

Youngsters are the youngest age group in the Youth Sports System (SSM) in Poland, where sports training for gifted youth is conducted within the provincial team [5]. From 2018, in judo in Poland, youngsters are 14-15 and juniors – 18-20 years old [6]. According to the regulations of the World Judo Federation, competitors who are at least 15 years old (for a calendar year) [7] have the right to start in competitions of the senior age category, i.e., when referring to the competition at the national level, the oldest competitor from the youngster group has the right to take part. The judoists practically do not compete in the senior group, but more than once, juniors do it successfully, an excellent example of winning the Seniors World Champion title in 2018 by less than an 18-year-old competitor from Ukraine – Daria Bilodid [8].

In the studies related to comprehensive and special physical fitness issues conducted so far, athletes of the male provincial team level have not been analyzed. There were also no analyses of their individual components in the youngster and junior age groups.

The research aimed to identify the relationships between comprehensive and special fitness and their individual components among judoists from the provincial judo team in the youngster and junior age groups. Because it is the level where formal and organized training takes place, it can serve as a useful reference for coaches whose athletes are trying to qualify for the provincial team in their age category. It will be useful in planning training cycles in which individual motor skills, showing the most remarkable dependence on each other, will be combined. Besides, these studies can be a useful reference in the case of studies conducted on a group of national team judoists, which would provide information about the importance and relationship of comprehensive and unique motor skills in judo at different levels of advancement.

Material and research methods

The study involved judo athletes from provincial teams from the Wielkopolskie and Lubelskie Provinces. They were appointed for the summer training camp, which took place at the same time and place, and it was the same (preparatory) period in the training organization plan for all respondents. The research was carried out at the beginning of the summer training camp during the preparation for the second part of the season. Ten athletes from the youngster age group (under 16) and seven from the junior category (under 21) were examined. The mean age in the first group was 14.56 (SD = 0.56), and in the other – 19.06 (SD = 0.91). The training experience was 6.45 (SD = 1.54) and 10.86 (SD = 1.35) years, respectively.

The general physical fitness test was carried out using the International Special Judo Fitness Test consisting of a 50 m run [s], long jump [cm], 800 m run [s], dynamometric hand measurement [kg], pull-ups on the stick, agility run 4×10 m [s], forward bends from backward lying for 30 seconds, and forward torso bends [cm]. The comprehensive physical fitness tests were divided into two days. The evaluation of the results obtained in individual tests was made based on score tables regarding the respondents' calendar age to compare the specific components' level reliably [9].

The study of special physical fitness was carried out using the Special Judo Fitness Test [10]. The test consists in working in intervals in three series, separated by 10 s breaks. The study involves 3 exercising athletes – 1 participant and 2 co-exercising ones. The tested competitor stands between the exercising persons, at the 3 m distance from each of them. When signaled, he/she moves from one person to the other and performs the ippon seoi nage throw. During the test, the throws made in each series, their sum, and the heart rate (HR) are measured immediately after the test and 1 minute after the test ends. The ratio (HR immediately after (a heartbeat per minute) + HR after 1-minute rest) / the sum of the throws is calculated based on the above measurements. To simplify the interpretation, it can be said that the lower the value of this indicator, the better the test result should be assessed [10].

Statistical methods

Due to the small number of respondents, the Spearman's rank correlation was applied for statistical analysis with the use of the Statistica 13 program.

Analysis of the results

Table 1 displays the statistical characteristics of the results of motor tests in youngsters and juniors. In all tests, except for one, included in the comprehensive physical fitness test, the junior age group's judoists obtained better results than the youngsters.

The provincial team athletes under 16 obtained, on average, 417.6 (SD = 46.43), while those up to the age of U21 obtained 499.43 (SD = 34.63) points. When comparing the above, it is evident that the older ones have a nearly 20% better level of all-round physical fitness than the youngsters, relating their results to age norms.

The analysis of the Special Fitness Test (Table 2) includes the number of throws made, heart rate after the test, heart rate after 1 minute of rest, and the index (which is the final form of assessing the special fitness level that was calculated on this basis). The youngster age group judoists made on average fewer throws (26.2; SD = 2.74) than the juniors (27.86; SD = 4.02). The youngsters also had a lower heart rate immediately after the test (188.6; SD = 12.58) than the juniors (193.71; SD = 7.52). After 1 minute of rest, the U16 team athletes showed a higher heart rate (129.2; SD = 15.95) compared to the U21 team athletes (126; SD = 6.93). When calculating the index, the lower, i.e., following the test assumptions, better was achieved by the juniors who reached 11.7 (SD = 1.86) compared with 12.19 (SD = 0.85) of the youngsters.

Performing statistical analysis of comprehensive fitness and special fitness of the judo team athletes in the youngster group (Table 3), links with age, versatile and special fitness, and individual components of the comprehensive physical fitness were shown. Although the age difference in the youth group is not large (the youngster group includes two years), it showed three significant relationships. Older athletes were characterized by lower hand strength ($r =$

Table 1. Results of athletes' comprehensive physical fitness in the youngster and junior age groups

Variable	Youngsters		Juniors	
	Results [points]	Standard deviation	Results [points]	Standard deviation
50 m run	40.30	10.98	50.57	5.97
Standing long jump	51.20	9.22	57.57	9.68
800 m run	48.50	7.86	59.57	1.62
Hand strength	49.50	9.02	49.71	8.83
Pull-ups on the stick	55.50	9.49	92.43	9.74
4x10 m run	43.40	8.85	49.71	6.70
Forward bends from backward lying	75.30	12.00	89.71	10.92
Forward torso bends	53.90	5.15	50.14	6.77
Total points	417.60	46.43	499.43	34.63

Source: Own study.

Table 2. Results of the Judo Special Fitness Test

Variable	Youngsters		Juniors	
	Results	Standard deviation	Results	Standard deviation
Total throws	26.20	2.74	27.86	4.02
HR after the test	188.60	12.58	193.71	7.52
HR after 1 minute of rest	129.20	15.95	126.00	6.93
Index	12.19	0.85	11.70	1.86

Source: Own study.

-0.69; $p < 0.05$), more throws ($r = 0.76$; $p < 0.05$) and a lower (i.e., better) index of the Special Judo Fitness Test ($r = -0.79$; $p < 0.05$). The relationships between all-round and special fitness concerned the number of throws made in the third series, the sum of all throws made, and the heart rate after 1 minute of rest. Relationships were found with the number of throws made, indicating that people with greater hand strength make fewer throws in 3 series ($r = -0.72$; $p < 0.05$) and in all series in total ($r = -0.68$; $p < 0.05$). Moreover, a lower total number of throws was recorded among people achieving a higher result in the forward torso bend test ($r = -0.65$; $p < 0.05$). The higher heart rate after 1 minute of rest was achieved by those who scored more points for their results in the long jump ($r = 0.66$; $p < 0.05$), the 800 m run ($r = 0.73$; $p < 0.05$), and forward bends from backward lying ($r = 0.92$; $p < 0.05$). The links between the various comprehensive physical fitness dimensions mutually increasing the level were demonstrated. The athletes achieving higher results in the long jump obtained better results in the 50 m run ($r = 0.64$; $p < 0.05$), the 800 m run ($r = 0.78$; $p < 0.05$), 4x10 m run ($r = 0.68$; $p < 0.05$), and forward bends from backward lying ($r = 0.71$; $p < 0.05$). Moreover, a similar

Table 3. Significant correlations of athletes' comprehensive and special fitness in the youngster age group

Variable	Age	50 m run	Long jump	800 m run	Hand strength	4×10 m run	Forward bends from backward lying	Forward torso bends	Total points
50 m run	-0.06								
Long jump	-0.02	0.64							
800 m run	0.31	0.38	0.76						
Hand strength	-0.69	0.12	-0.14	-0.39					
4×10 m run	-0.31	0.67	0.68	0.28	0.25				
Forward bends from backward lying	-0.15	0.51	0.71	0.69	-0.26	0.48			
Total points	-0.28	0.60	0.89	0.76	0.04	0.65	0.84	0.34	
TSSR Judo – 3 rd series	0.76	0.15	0.07	0.18	-0.72	0.06	0.06	-0.57	-0.15
TSSR Judo – total throws	0.55	-0.28	0.06	0.20	-0.68	0.03	0.16	-0.65	-0.09
TSSR Judo – HR after 1 min	-0.07	0.49	0.66	0.73	-0.30	0.50	0.92	-0.06	0.80
TSSR Judo – index	-0.79	0.02	-0.26	-0.47	0.55	-0.08	0.01	0.54	-0.04

Source: Own study.

relation was demonstrated by the relationship between the 50 m run and the 4×10 m run ($r = 0.67$; $p < 0.05$) and the 800 m run, and the forward bends from backward lying ($r = 0.69$; $p < 0.05$). Importantly, the overall level of all-round physical fitness was most shaped by obtaining higher results in the long jump ($r = 0.89$; $p < 0.05$), in the 800 m run ($r = 0.78$; $p < 0.05$), the 4×10 m run ($r = 0.65$; $p < 0.05$) and forward bends from backward lying ($r = 0.84$; $p < 0.05$).

When analyzing the significant relationships between the juniors' comprehensive and special physical fitness (Table 4), relationships between the individual components of comprehensive fitness in relation to each other, and the relationship with one of the Special Fitness Test elements were noted. Significant relationships were found with the heart rate after 1 min rest after completion of the Special Fitness Test. Competitors who obtained more points in the 50 m run ($r = 0.88$; $p < 0.05$), long jump ($r = 0.82$; $p < 0.05$), and the dynamometric measurement of hand strength ($r = 0.78$; $p < 0.05$) had a higher heart rate measured 1 minute after the end of the test. Searching for the relationships of the individual components of versatile fitness, significant mutually reinforcing ones were noticed between the long jump and 50 m run ($r = 0.92$; $p < 0.05$) and the 800 m run ($r = 0.78$; $p < 0.05$), between pull-ups on the stick and a forward bend from backward lying ($r = 0.80$; $p < 0.05$) and a forward torso bend ($r = 0.77$; $p < 0.05$), which additionally correlates positively with forward bends from backward lying ($r = 0.98$; $p < 0.05$). Importantly, it was noted that more points for the entire comprehensive physical fitness test were obtained by the athletes who achieved better results in the 800 m run ($r = 0.81$; $p < 0.05$), hand strength ($r = 0.85$; $p < 0.05$) and pull-ups on the stick ($r = 0.80$; $p < 0.05$).

Table 4. Significant correlations of athletes' comprehensive and special fitness in the junior age group

Variable	50 m run	Long jump	800 m run	Hand strength	Pull-ups on the stick	Forward bends from backward lying	Forward bends	Total points
50 m run								
Long jump	0.92							
800 m run	0.56	0.78						
Hand strength	0.58	0.64	0.59					
Pull-ups on the stick	0.00	0.18	0.51	0.66				
Forward bends from backward lying	-0.27	0.04	0.43	0.22	0.80			
Forward bends	-0.25	0.07	0.40	0.24	0.77	0.98		
Total points	0.49	0.70	0.81	0.85	0.80	0.60	0.63	
TSSR Judo – HR after 1 min	0.88	0.82	0.54	0.78	0.32	0.00	-0.02	0.64

Source: Own study.

Discussion

Problems that repeatedly arise in research on special fitness are the certainty of the usefulness of a given unique fitness tool and the legitimacy of using it in specific age groups, mainly young players. In research aimed at verifying the legitimacy of the use of the special judo motor fitness test, namely the Sterkowicz Test, the usefulness of using it in the senior and junior age groups and age groups including underage judoists was compared. The study involved athletes of all age groups who underwent the same training. The results (based on the level of lactates in the blood after exercising) showed a high similarity of the test to sports combat and a particular training form – randori. The examination proved the legitimacy of subjecting all age groups to the Sterkowicz Test, which is excellent preparation for a sports fight [11]. Regular assessment of comprehensive and special fitness levels will allow drawing many useful conclusions and possibly modifying the sports preparation process. Based on this, it is necessary to monitor the athlete's long-term changes, compare the obtained results to track changes, and look for determinants affecting the level of special fitness similar to sports combat. Besides, it will make it possible to optimize the creation of individual training cycles in motor terms to maximize the comprehensive and special preparation, which are integral components of judo sports combat.

When comparing the provincial team athletes, it can be observed in the youngster and junior age groups that in all trials (excluding the flexibility test) and in the overall approach, those from the older group are at a higher level of versatile physical fitness. As in the comprehensive physical fitness test, the junior age category judoists also present a higher level of special fitness. That is mainly evidenced by the number of throws made in the same time unit and the

index whose value is lower than in the youngster group. It indicates that it is necessary to raise the level of physical fitness, both comprehensive (concerning the population) and special (in relation to younger athletes), to stay at the provincial team level. Similar relationships were shown in tests on differences in morphological and physiological characteristics among elite senior and junior judo athletes [12], where a better predisposition to results in the senior age group than in the junior age group was revealed in all monitored areas. The identified and desired traits for athletes with lower performance levels were shown as the cause [12]. In this case, the lower efficiency level can be understood in two ways: as the age where the athletes are in the lower age group (senior–junior; junior–youngster) and as the lower level of sports struggles (the national team judoists – the provincial team judoists). Moreover, other studies have concluded that judo athletes undergoing long-term performance-oriented training tend to have similar results in special tests after some years of training of the same type [13]. However, it emphasizes the need to follow the athlete's training process from an early age and carefully test and analyze changes in individual components of his/her fitness.

In this case, age is strongly related to the knowledge of human development, the sensory phases of specific motor skills and the ability to develop them and to plan appropriate loads in different age groups [14]. This issue is particularly relevant for youth athletes, who are in a period of dynamic ontogenetic development, which may translate into an individual level of comprehensive fitness. In the youngster age group on the provincial team level, the most shaping general dimensions are leg muscle strength, endurance, agility, and abdominal muscle strength. In the group of juniors presenting this level, the most influential in the overall dimension are endurance, hand strength and arm strength. Therefore it can be assumed that it is necessary to continuously shape and strengthen endurance, and as the athlete grows up, to focus more on upper limb strength. It may be confirmed by the fact, that in the group of youngster athletes it has been noticed that the excessive hand strength negatively influences the particular elements of the special judo fitness test. Therefore it can be concluded, that the excessive concentration on the upper limbs strength training in this group does not positively influence the special physical fitness, which can often influence the effect of the fight. Moreover, taking into consideration the age of the athletes in the youngster group and the development of their anthropometrics, training at this stage should be aimed at a holistic and balanced, all-round development. Confirmation of these observations can be studies on changes of physical and special abilities of teenage judo competitors during 4 week preparation period to national championships. There was also an inverse correlation in strength tests of: hands (in the handgrip test), legs (in the jumping height test) and arms (in the 30-second test on the rope trainer) with special fitness, measured by the Sterkowicz Test. The authors of these studies indicated that during the preparatory period one should focus more on shaping comprehensive and special fitness, so that during the period of intensive preparation for the championships none of the physical fitness dimensions would negatively influence the special fitness [15].

When analyzing the relationships of the comprehensive fitness individual components, it can be assumed that in the same training period (cycle) one can focus on related components, thanks to which their training may lead to mutual shaping and increasing the training level. In the group of youngsters, speed training could be combined with the muscle strength of the lower limbs and agility, muscle strength of the lower limbs with speed, endurance, agility and the abdominal muscle strength, endurance with the strength of the lower limbs and the abdominal muscle strength, agility with the speed and strength of the lower limbs, and the strength of the abdominal muscles with the strength of the lower limbs and endurance.

However, at this age, special attention should be paid to the types of fitness and the correct planning of loads and arranging training units that shape training cycles. Thus, at the adolescence age, the training of maximum strength, strength endurance, and anaerobic endurance should only be initiated, training of general strength, speed and aerobic endurance should be gradually increased in volume, and flexibility training may have the character of competitive training [16]. It is the careful control of ontogenetic changes in athletes and taking them into account along with sensitive periods and the demonstrated relationships between the components of comprehensive fitness as well as comprehensive and special physical fitness in the training process that can give this age group a significant progress in sports preparation for competition at least at the provincial level.

Similarly, in the junior category, the most significant effect in shaping versatile fitness can be expected when combining speed training with the strength of the lower limbs, strength of the lower limbs with speed and endurance, endurance with the strength of the lower limbs, strength of the upper limbs with the strength of the abdominal muscles and flexibility, the abdominal muscle strength with the strength of the upper limbs and flexibility, and flexibility with the strength of the upper limbs and the abdominal muscles strength. Similar results were shown in tests related to biomechanics and special methods for judo training process control in the junior group. The relationship between absolute and relative power output and speed in the maximum cyclo-ergometric test and the ratio in the judo motor fitness test was demonstrated. In the junior training process, it has been pointed out that it is necessary to regularly shape and test the level of comprehensive and special fitness, as there is a significant relationship between them [17]. When bearing in mind those dependencies and the interdependencies of individual motor skills demonstrated in the conducted research, it will be possible to create training cycles that will be more individualized and optimized for the athlete (based on previously conducted regular testing). In principle, the desired effect of such activities will be to increase the level of comprehensive and special fitness, which significantly affects the level of sports combat. That, in turn, may translate into an increase in the provincial team judoist's sports level, in the youngster and junior groups, respectively.

Conclusion

For the athlete to stay at the provincial team level, from the youngster to junior age group, one of the necessary elements is to raise his/her level of physical fitness, both versatile and special.

In the adolescent age group, comprehensive physical fitness showed more relationships with special judo fitness levels than in the junior group at the provincial team level. That indicates that at an earlier age, the level of versatile fitness of judoists has a more significant impact on sports results than in older age.

In both age groups, comprehensive development of physical fitness is necessary. More attention should be paid to leg muscle strength, endurance, agility, and abdominal muscle strength in the youngster group, while in the junior group to endurance, hand strength, and arm strength. They significantly affect the overall level of all-round fitness in the provincial team athletes.

When planning training micro-cycles, it is possible to consider the combination of specific, interrelated motor skills, which will increase the effectiveness of the training process carried out in individual age groups.

Acknowledgement

No acknowledgement and potential founding was reported by the author.

Conflict of interests

The author declared no conflict of interests.

Author contributions

The author contributed to the interpretation of results and writing of the paper. The author read and approved the final manuscript.

Ethical statement

The research complies with all national and international ethical requirements.

ORCID

Adam Prokopczyk  <https://orcid.org/0000-0002-6694-7251>

References

1. Sozański H (ed.). *Podstawy Teorii Treningu Sportowego*. Warszawa: Biblioteka Trenera, COS; 1999.
2. Herzig M. *Trener – zawodnik – psycholog*. *Sport Wyczynowy*. 2004;7-8:13-9.
3. Klimczyk M. *Profil sprawności specjalnej medalisty mistrzostw świata juniorów w skoku o tyczce*. *Rocznik Naukowy AWFIS w Gdańsku*. 2010;20:79-86.
4. Ambroży T, Kisiel W, Kisiel D. *International Budo Federation. Geneza historia, trening i rywalizacja sportowa*. Kraków: WSBPI Apeiron; 2014.
5. Zespół Sportu Młodzieżowego Instytutu Sportu w Warszawie. *Zasady ogólne systemu sportu młodzieżowego*, [online]. Available at: <http://sport-mlodziejowy.pl/index.php/nasz-zespol/9-uncategorised/73-zasady-ogolne-systemu-sportu-mlodziejowego> [Accessed: 21 July 2020].
6. Polski Związek Judo. *Nowe kategorie wiekowe PZ Judo w roku 2018*, [online]. Available at: <http://web.pzjudo.pl/u18-u16-u14-u12-nowe-kategorie-wiekowe-i-przepisy-walki-w-2018-roku> [Accessed: 21 July 2020].
7. International Judo Federation. *Sport and Organization Rules*. Version: 8th October 2019.
8. Głaz K. *Daria Bilodid – najmłodsza mistrzyni świata*, [online]. Available at: <https://judoinfo.pl/daria-bilodid-najmlodsza-mistrzini-swiata/> [Accessed: 21 July 2020].
9. Pilicz S, Przewęda R, Dobosz J, Nowacka-Dobosz S. *Punktacja sprawności fizycznej młodzieży polskiej wg Międzynarodowego Testu Sprawności Fizycznej*. Warszawa: Studia i Monografie Akademia Wychowania Fizycznego im Józefa Piłsudskiego w Warszawie; 2002.
10. Sterkowicz S. *Test specjalnej sprawności ruchowej w judo*. *Antropomotoryka*. 1995;12:29-44.
11. Franchini E, Nakamura FY, Takito MY, Kiss MAPDM, et al. *Special judo fitness test in juvenile: junior and senior Brazilian judo players*. *Biology of Sport*. 2005;7:11-8.
12. Malá L, Maly T, Zahálka F, Heller J, et al. *Differences in the morphological and physiological characteristics of senior and junior elite Czech judo athletes*. *Archives of Budo*. 2015;11:185-93.
13. Katralli J, Goudar SS. *Anthropometric Profile and Special Judo Fitness levels of Indian Judo Players*. *Asian Journal of Sports Medicine*. 2012;3(2):113-8.
14. Szopa J, Mleczek E, Żak S. *Podstawy antropomotoryki*. Warszawa–Kraków: Wydawnictwo Naukowe PWN; 2000.
15. Fukuda DH, Stout JR, Kendall KL, Smith AE, et al. *The Effects of Tournament Preparation on Anthropometric and Sport-Specific Performance Measures in Youth Judo Athletes*. *Journal of Strength and Conditioning Research*. 2013;27(2):331-9.

16. Harasymowicz J. *Dziennik i plan pracy trenera*. Płock: Wydawnictwo Naukowe NOVUM; 2011.
17. Boguszewska K, Boguszewski D, Buśko K. *Special Judo Fitness Test and biomechanics measurements as a way to control of physical fitness in young judoists*. Archives of Budo. 2010;6(4):205-9.

Biographical note

Adam Prokopczyk – M.A., a graduate of the Eugeniusz Piasecki University School of Physical Education in Poznań (major in Physical Education) and the University of Adam Mickiewicz (the Faculty of National Security); university teacher at the Department of Sports and Defense Education of the University of Physical Education in Poznań; licensed judo trainer of the Polish Judo Association and the International Judo Federation. The main areas of his scientific interests include physical activity, training process in sport, martial arts and combat sports, and crisis management. The winner of the award for a young researcher for an original scientific article, awarded by the International Association of Sport Kinetics (IASK); scholarship holder of the academic exchange programs of the National Agency for Academic Exchange.

Sprawność fizyczna wszechstronna a specjalna zawodników judo kadry wojewódzkich w grupach wiekowych młodzik (U16) i junior (U21)

STRESZCZENIE

Celem badań było określenie związków między sprawnością fizyczną wszechstronną i specjalną zawodników trenujących judo. Badaniom poddano zawodników z grupy wiekowej młodzik (U16) i junior (U21), którzy są zawodnikami kadry wojewódzkiej. Do pomiaru sprawności wszechstronnej wykorzystano Międzynarodowy Test Sprawności Fizycznej, a do oceny sprawności specjalnej Test Specjalnej Sprawności Ruchowej w judo. Badania wykazały, że juniorzy prezentują wyższy poziom sprawności fizycznej wszechstronnej (z wyłączeniem gibkości) i specjalnej niż młodzicy. W grupie młodzika wykazano więcej związków sprawności fizycznej wszechstronnej ze sprawnością specjalną. Odnotowano, że w grupie wiekowej młodzika największy wpływ na poziom ogólny wszechstronnej sprawności fizycznej ma siła mięśni nóg, wytrzymałość, zwinność i siła mięśni brzucha, natomiast w grupie do lat 21 wytrzymałość, siła dłoni i siła ramion. Wykazano, że połączenie pewnych składowych sprawności wszechstronnej, w danym cyklu treningowym, może nieść pozytywne efekty w kształtowaniu tych cech w obu grupach wiekowych. Ponadto wykazano, że uwzględnianie rozwoju ontogenetycznego zawodnika, okresu sensytywnego w jakim się znajduje, związków pomiędzy składowymi sprawności wszechstronnej oraz pomiędzy sprawnością wszechstronną i specjalną może znacząco wpływać na efektywność prowadzonego procesu treningowego w obu grupach wiekowych.

SŁOWA KLUCZOWE judo, specjalna sprawność fizyczna, wszechstronna sprawność fizyczna, kadry wojewódzkie, junior

How to cite this paper

Prokopczyk A. *Comprehensive and special physical fitness of judo athletes of provincial national teams in the age groups: youngster (U16) and junior (U21)*. Scientific Journal of the Military University of Land Forces. 2021;53;4(202):680-89.

DOI: <http://dx.doi.org/10.5604/01.3001.0015.6173>



This work is licensed under the Creative Commons Attribution International License (CC BY).
<http://creativecommons.org/licenses/by/4.0/>