Criteria for rapid adaptability in judo during the training phase of athletes' preparation

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Abstract

Objective of the study is to identify criteria for rapid trainability in judo athletes during the training phase of their preparation.

Methods and structure of the study. A questionnaire survey was conducted to determine the level of fitness, physical fitness testing was carried out, anthropometric measurements were taken followed by the calculation of physical development indices, and blood group determination was performed. The study was conducted at the Olympic Reserve Sports School in the Vasileostrovsky District of St Petersburg. A total of 34 judo athletes aged between 12 and 14 years, representing all weight categories and with between 3 and 7 years' experience in the sport, were examined.

Results and conclusions. Analysis of the questionnaires revealed the individual timeframes within which judokas achieved a specific level of sporting qualification, enabling them to be divided into two groups: fast learners and slow learners. It was found that the morphological indicators reliably distinguishing fast-training judokas include: low values for the Yarkho-Kaupe weight-height index, the Pigne index and the proportionality index, a normostenic body type, and belonging to blood group III (B). Fast-training judokas outperform slow-training judokas in physical fitness according to the results of two tests: push-ups and forward bends from a standing position on a gymnastics bench.

The data obtained can serve as criteria for the sporting selection of young judokas during the training phase.

Keywords: *judoists, stages of preparation, trainability, training phase, athlete selection.*

Introduction. The development of scientifically sound methods for selecting athletes of different ages and levels of fitness is a pressing issue and requires the close attention of coaches and researchers. A number of studies have been devoted to the issues of athlete selection in combat sports, covering both morphofunctional indicators [3, 5, 8] and the psychophysiological potential of athletes [2, 6]. At the same time, the problem of identifying promising judokas at the early stages of training has not yet been fully resolved.

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Results of the study and discussion. A survey designed to assess the level of trainability among young judokas enabled them to be divided into two groups. The first group comprised fast-training judokas (9 individuals), who took no more than 4 years to achieve the first-level junior sports qualification. The second group consisted of slow-training judokas (11 individuals), who achieved the first-level junior sports qualification after 4-7 years.

As it turned out, in the group of fast-training judokas aged 12-14, significant differences were observed in a number of morphological indicators compared

with slow-training athletes (Table 1). Thus, fast-training judokas are characterised by significantly lower body length, weight-to-height ratio, Pigne's index and proportionality index, relatively short lower limbs and a wide pelvis. This is confirmed by the results of studies on the morphofunctional indicators of martial artists [5, 7, 8].

Based on M.V. Chernorutsky's somatotype classification, it can be concluded that normostenics-characterised by a proportional balance between the body's longitudinal and transverse dimensions-predominate among judokas who adapt quickly to training, whilst athletes who adapt more slowly to training tend to have a more asthenic physique. A study of blood groups in athletes with different levels of trainability revealed a significant predominance of group III (B) among fast-training athletes and group II (A) among slow-training athletes. It appears that the significant number of individuals with blood group III (B) – the phenotype of fast-trained judokas – corresponds to the high speed and coordination capabilities of athletes in this discipline.

When conducting physical fitness tests approved by the Federal Standard for Sports Training at the training stage for the sport of 'judo', significant differences were found in the results of two tests among fast- and slow-training wrestlers: arm flexion and extension in the push-up position and forward bending from a standing position on a gymnastic bench (Table 2). Similar results were obtained in a study of the characteristics of technical and tactical training of student wrestlers at different age stages [1, 4]

Fast training judokas significantly outperformed low training athletes in the results of these tests. As for the indicators in the remaining tests characterising the physical fitness of judokas with different levels of training, it should be noted that there were no significant differences between the groups under study.

It should be noted, however, that in the tests proposed by the Federal Standard for Sports Training in the sport of 'judo', shuttle run is the only test included among those assessing motor coordination. At the same time, the diversity of coordinative types of motor activity requires them to be assessed according to various criteria: the time taken to master a new movement, the time required to alter a combination of movements in accordance with a changed situation, the coordinative complexity of movement sequences, the accuracy and stability of their execution, and the maintenance of stability when balance is disrupted.

All the more so because the differences we observed between fast-training and slow-training judokas show a significant predominance of group III(B) among fast-training athletes, which corresponds to their superior coordination abilities, which evidently ensure their faster trainability in this sport compared to athletes with slow trainability. We therefore believe that, when assessing the physical fitness of 12–14-year-old judokas as they transition to the training phase, it is necessary to include tests such as exercises involving asymmetrical coordination of movements of the arms, legs, head and trunk; tests of balance and vestibular stability; standing long jumps from a starting position with the back and side facing the landing area; forward somersaults.

The absence of significant differences in the results of the 'shuttle run' test between fast-training

Table 1. Comparative assessment of individual typological indicators for judokas in different groups (M+m)

Individual typological indicators	Groups of judokas	
	Fast training (n=9)	Slow training (n=11)
Body length, cm	159,9+2,9	164,5+3,8*
Body weight, kg	49,0+1,5	51,8+1,5
Chest circumference (at rest), cm	83,1+2,9	82,9+4,3
Chest circumference (inhalation), cm	88+2,1	86,8+2,1
Chest circumference (exhalation), cm	80+2,1	79,3+2,1
Chest expansion, cm	8+2,1	7,5+2,1
Body mass index, g/cm	306,4+9,5	314,8+10,2*
Pigne index, u.e.	30,9+0,9	33,4+1,1*
Livi index, %	51,9+1,9	50,3+2,1
Proportionality index, %	74,8+2,2	78,1+2,6*

*Note: n – sample size; M – arithmetic mean; m – standard error of the mean; * – differences between fast-training and slow-training judokas are statistically significant, $p < 0.05$.*

Table 2. Results of physical fitness testing among judokas, M+m

Physical fitness tests	Groups of judokas	
	Fast training (n=9)	Fast training (n=9)
Pull-ups on a 90 cm low bar, number of repetitions	21,4 ± 0,2	19,5 ± 0,3
Push-ups, number of repetitions	51,0 ± 0,5	32,5 ± 0,9*
Forward bend from a standing position on a gym bench, cm	10,3 ± 0,2	4,5 ± 0,4 *
Shuttle run 3 x 10 m, with	7,5 ± 0,2	7,6 ± 0,2
Sit-ups from a supine position (in 30 seconds), number of repetitions	32,7 ± 1,5	27,1 ± 1,3
Standing long jump with a two-foot take-off, cm	203,4 ± 0,6	192,4 ± 0,7

*Note: n – sample size; M – arithmetic mean; m – standard error of the mean; * – differences between fast-training and slow-training judokas are statistically significant, $p < 0.05$.*

and slow-training judokas indicates that using this test alone is insufficient for assessing athletes' coordination abilities. To assess the physical fitness of judoists aged 12-14 when transitioning athletes to the training phase, it is recommended that, in addition to the tests approved by the Federal Standard for Sports Training in the sport of 'judo', the coordination tests mentioned above be included.

Conclusions. The morphological indicators that reliably distinguish fast-training judokas include: low values for the Yarkho-Kaupe weight-to-height index, the Pigne index and the proportionality index; a normostenic body type; and blood group III (B). Among those who train slowly, in most cases there are asthenics with a dolichomorphic body type and belonging to blood group II (A).

Fast-training judokas outperform slow-training ones in physical fitness according to the results of two tests: push-ups and forward bends from a standing position on a gymnastic bench. The data obtained may serve as criteria for the sporting selection of young judokas during the training phase.

References

1. Bavykin E.A., Zinovev N.A., Sidorenko S.A. Osobennosti tekhniko-takticheskogo masterstva bortsov-studentov na raznyh vozrastnyh etapah. Teoriya i praktika fizicheskoy kultury. 2018. No. 4. Pp. 60-62.
2. Kuzmin M.A., Smirnova N.N., Kostromin O.V. Tekhnologiya psihologicheskoy adaptatsii sportsmenov k usloviyam sorevnovaniy s uchetom ih lichnostnyh osobennostey. Teoriya i praktika fizicheskoy kultury. 2020. No. 3. Pp. 39- 40.
3. Levitskiy A.G., Rudenko G.V., Tkachuk M.G., Kostromin O.V. Individualno-tipologicheskie osobennosti dzyudoistov razlichnyh vesovyh kategoriy. Teoriya i praktika fizicheskoy kultury. 2024. No. 3. Pp. 92-94.
4. Pavlenko A.V., Rudenko G.V., Vinogradov Yu.I. Osobennosti podgotovki sportsmenov i dinamika razvitiya studencheskogo thekvondo g. Sankt-Peterburga. Teoriya i praktika fizicheskoy kultury. 2019. No. 4. Pp. 67-69.
5. Rudenko G.V., Simakov A.M., Vasilev D.A., Tkachuk M.G. Morfofunktsionalnye kriterii bystroy treniruemosti v thekvondo. Teoriya i praktika fizicheskoy kultury. 2024. No. 4. Pp. 92-94.
6. Savelev D.S., Sidorenko S.A. Vliyanie zanyatiy sportivnymi edinoborstvami na psihofiziologicheskiy potentsial studentov-pervokursnikov. Teoriya i praktika fizicheskoy kultury. 2017. No. 5. Pp. 43-45.
7. Sobolev A.A., Tkachuk M.G., Levitskiy A.A. Morfofunktsionalnye kriterii bystroy treniruemosti sambistov. Uchenye zapiski universiteta im. P. F. Lesgafta. 2018. No. 7. Pp. 247-250.
8. Tkachuk M.G., Oleynik E.A., Dyusenova A.A. Osnovy sportivnoy morfologiya: uchebnoe posobie. Nats. gos. un-t fiz. kultury, sporta i zdorovya im. P.F. Lesgafta, Sankt-Peterburg. 2013. 102 p.