

## COMPARATIVE ANALYSIS OF THE DEVELOPMENT DYNAMICS OF PHYSICAL INDICATORS IN JUDO STUDENTS DURING THE PHYSICAL PREPARATION PERIOD

**Mamedov Shokhrukh Koysin ugli**

Master's Student, Faculty of Taekwondo  
and Sports Activities  
, National University of Uzbekistan, Tashkent

**Shukurova S.S**

Candidate of Technical Sciences, Associate Professor,  
Scientific Supervisor, National University  
of Uzbekistan, Tashkent  
<https://doi.org/10.5281/zenodo.20465909>

### Abstract.

This article presents a comparative analysis of the dynamics of physical indicators of judoka students during the general physical training period. The study involved 24 judoka students, divided into control and experimental groups. A special multi-factor set of exercises ensuring physiological adaptation to speed-strength loads was applied in the experimental group. The mathematical and statistical analysis of the results proved that the proposed methodology effectively improves speed-strength indicators and special endurance by an average of 8–12% compared to the control group.

**Keywords.** judo, student-athletes, physical training period, development dynamics, speed-strength loads, physiological adaptation, multi-factor monitoring.

**Аннотация.** В данной статье проведен сравнительный анализ динамики физических показателей студентов-дзюдоистов в период общефизической подготовки. В исследовании приняли участие 24 студента-дзюдоиста, разделенные на контрольную и экспериментальную группы. В экспериментальной группе применялся специальный мультифакторный комплекс упражнений, обеспечивающий физиологическую адаптацию к скоростно-силовым нагрузкам. Результаты математико-статистического анализа доказали, что предложенная методика эффективнее развивает скоростно-силовые показатели и специальную выносливость в среднем на 8–12% по сравнению с контрольной группой.

**Ключевые слова.** дзюдо, студенты-спортсмены, период физической подготовки, динамика развития, скоростно-силовые нагрузки, физиологическая адаптация, мультифакторный мониторинг.

**Introduction.** Judo is a rotational (acyclic) sport that requires high speed-strength, agility, and anaerobic endurance under variable conditions and active opponent resistance. Student years (18–21 years) correspond to the period of athlete physical and physiological maturity, specifically the maximum adaptation of the body to speed-strength loads.

The general physical training (GFP) period of the annual macrocycle creates the foundation of the athletic form. In traditional training systems, an imbalance is often observed between the development of speed-strength and special endurance indicators in judokas. Modern sports theory

and physiology require relying on multi-factor monitoring mechanisms when evaluating the physical fitness of student-athletes. The aim of this study is to conduct a comparative analysis of the dynamics of physical indicator development and to scientifically substantiate the effectiveness of targeted speed-strength loads during the physical training period of judo students.

**Methodology and object of the research.** The study was conducted on the basis of students of the Faculty of Combat Sports of the Uzbekistan State University of Physical Culture and Sports. A total of 24 young judokas aged 18-21 with I sports category and Candidate qualification (CMS) were involved in the experiment. The athletes were divided into two equal groups:

Control group (CG, n=10): Trained according to the traditional training program approved for university sports clubs.

Experimental group (EG, n=10): During the preparatory period, they trained according to a specially developed multi-factor program that primarily enhances physiological adaptation to speed-strength loads, incorporating elements of crossfit and balance (coordination) exercises.

The study was conducted at the beginning (September) and end (November) of the preparatory period. The obtained results were statistically processed using Student's t-test (reliability level  $P < 0.05$ ). To assess physical fitness, 5 control tests were taken.

**Research results and their scientific analysis.** At the initial stage of the study, there was no statistically significant difference between the average physical indicators of the athletes in both groups ( $P > 0.05$ ), which indicates that the initial state of the groups is equal. The re-test results obtained after a two-month period of targeted physical training revealed significant dynamic differences between the groups; the dynamics of these changes are presented in Table 1.

Table 1. Dynamics of growth in the physical indicators of judo students at the beginning and end of the preparatory period (NG n=10; TG n=10).

| Control tests (unit of measurement)      | Groups | Initial result ( $X \pm m$ ) | Final result ( $X \pm m$ ) | Growth rate ( $\Delta\%$ ) | P (reliability) |
|------------------------------------------|--------|------------------------------|----------------------------|----------------------------|-----------------|
| 30m Run (seconds) - Speed                | CG     | 4,51 $\pm$ 0,04              | 4,44 $\pm$ 0,03            | +1,5%                      | $P > 0,05$      |
|                                          | E G    | 4,48 $\pm$ 0,05              | 4,26 $\pm$ 0,04            | +4,9%                      | $P < 0,05$      |
| Standing Long Jump (cm) - Speed-Strength | CG     | 228,4 $\pm$ 3,1              | 236,2 $\pm$ 2,8            | +3,4%                      | $P > 0,05$      |
|                                          | E G    | 226,5 $\pm$ 2,9              | 249,6 $\pm$ 2,5            | +10,2%                     | $P < 0,01$      |
| Barbell Pull (times) - Absolute Strength | CG     | 14,2 $\pm$ 0,8               | 15,8 $\pm$ 0,6             | +11,2%                     | $P < 0,05$      |
|                                          | E G    | 14,0 $\pm$ 0,7               | 17,5 $\pm$ 0,5             | +25,0%                     | $P < 0,01$      |
| 10x10m Shuttle Run (seconds) - Agility   | CG     | 26,8 $\pm$ 0,3               | 26,2 $\pm$ 0,2             | +2,2%                      | $P > 0,05$      |
|                                          | E G    | 26,9 $\pm$ 0,4               | 24,8 $\pm$ 0,2             | +7,8%                      | $P < 0,05$      |
| In 1 minute dummy                        | CG     | 22,4 $\pm$ 1,1               | 24,1 $\pm$ 1,0             | +7,5%                      | $P < 0,05$      |
|                                          | E G    | 22,1 $\pm$ 1,2               | 27,6 $\pm$ 0,9             | +24,8%                     | $P < 0,01$      |

|               |  |  |  |  |  |
|---------------|--|--|--|--|--|
| throw (times) |  |  |  |  |  |
| - Special     |  |  |  |  |  |
| Endurance     |  |  |  |  |  |

Analysis of the obtained mathematical and statistical figures shows that positive growth was also observed in the control group engaged in the traditional method, but the indicators are primarily extensive in nature. It was revealed that the growth rate in the experimental group is intensive in terms of the most important qualities in acyclic sports:

In the long jump from a standing position in the rapid-strength (explosive force) adaptation exercises, the increase in the CG was only 3.4%, while in the EG, this figure reached 10.2% (249.6 cm) ( $P < 0.01$ ). In judo, knocking an opponent out of balance and entering a technique occurs precisely through the explosive power of the leg and pelvic muscles. These figures confirm that the jump plyometry exercises used in the EG significantly improved the synchronous contractility of muscle fibers in the neuromuscular apparatus.

Indicators of coordination and agility dynamics play an important role in the judo tatami by sharply changing the direction of movement. Based on the results of the 10x10 m shuttle run, the EG athletes managed to reduce their time from 26.9 to 24.8 seconds (in the CG, the change was statistically insignificant,  $P > 0.05$ ). This indicates the rapid physiological adaptation of the vestibular apparatus to target loads in young athletes.

In the special speed-strength endurance test, the most reliable test for assessing a judoka's functional state in the tatami is the "throwing a mannequin in 1 minute" test. As seen from the table, by the end of the preparatory period, the CG athletes increased their results to 24.1 times (a 7.5% increase), while the EG athletes increased this indicator to 27.6 times (a 24.8% increase) ( $P < 0.01$ ). From a biochemical perspective, this result indicates an increase in the power of the anaerobic lactate mechanism in EG athletes; that is, the body is adapted to continue performing intensive mechanical work even under conditions of rapid fatigue.

**Conclusion.** As a result of a comparative study of the dynamics of physical indicators during the general training period of judo students, the following conclusions were drawn. Although traditional training programs in the practice of higher education institutions increase the athlete's general endurance and absolute strength to a certain extent, they cannot develop the qualities of speed-strength and special acyclic endurance, which are extremely important for judo, at the required level.

The use of a complex of multifactorial exercises in the macrocycle of the preparatory period, stimulating the nervous system and accelerating physiological adaptation to speed-strength loads, ensured a reliable increase in physical qualities by 10–25% in the athletes of the experimental group.

The obtained indicators contribute to the transition of athletes to the pre-competition period (stage of special training) with a deep functional reserve. During the training process, managing loads based on growth dynamics (monitoring) is the most effective factor in improving the athletic skills of student-athletes.

#### List of references

1. Zakrin, F. Kh. Planning of special physical training for judokas at the stage of improving sports mastery / F. Kh. Zakrin // Theory and Practice of Physical Culture. – 2022. - No. 10. – P. 90-92.
2. Falin, I. O. Research on the developmental characteristics of 9–11-year-old judokas in preparation for competitive activity / I. O. Falin // NovaInfo.Ru. - 2023. – No. 140. – P. 155-158.

Journal: <https://ifsmrc.org/index.php/aijrm>

3. Chatinyan, A. A. Modern approaches to organizing the physical training process of young judokas / A. A. Chatinyan, A. V. Avetisyan // Science and Sports: Modern Trends. – 2022. – Vol. 10. – No. 2. – pp. 84-91
4. Indicators of targeted physical fitness in judo and jujutsu - Preliminary results of research / W. J. Cynarski, J. Słopecki, B. Dziadek [et al.] // International Journal of Environmental Research and Public Health. - 2021. Vol. 18. - No. 8. – P. 43-47.