

Coefficient Of Individual Difficulty Factor- Method Of Self - Control In Artistic Gymnastics

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Abstract: The article is presented, the possibilities of conducting targeted control and adjustment of the training process based on the subjective assessment of the difficulties that gymnasts face when performing gymnastic exercises in multiple fight types are considered. According to the data of the correlation analysis and the results of control tests on special motor fitness, it is possible not only to determine the level of individual physical, technical and psychological difficulty of the program requirements, but also to compare the growth rates of the complexity of programs for gymnasts with different levels of preparedness to identify the most promising ones. This allows the coach and the gymnast to regulate the parameters of the load being performed and to predict the sports result, to increase the efficiency of managing the educational and training process of young gymnasts at all stages of training.

Keywords: program, coordination abilities, difficulty, control, technical complexity, methods of subjective assessments, fitness, preparedness, types of training, evaluation tables.

Relevance. It is not always possible to assess the state of an athlete with the help of instrumental studies, moreover, in most cases, only individual functions of the body are studied [2,5]. Therefore, it seems appropriate to assess the state of readiness of an athlete to use, along with instrumental studies, methods of subjective assessments (self-assessments) of preparedness [6,7,8,9].

A systematic assessment of one's own state helps the athlete to know himself more fully, to plan training more effectively together with the coach [1,3,4,5,6,9]. Some coaches, unfortunately, do not trust athletes' self-assessments precisely because of their subjectivity [3,7,8].

The conducted studies have shown that subjective assessments can be successfully used to determine the state of athletes, their desire to train [1,3,5,9,11]. With their help, you can accurately determine the severity of muscle work, evaluate the quality of training. It has been proven that with the accumulation of experience, the accuracy of subjective assessments increases, and the reliability increases, especially if they are regularly compared with the corresponding objective assessments [1,2,5,9].

Methods of self-control in gymnastics are becoming more widespread [1,2,3,5,10,11].

The purpose of the research. Identify the intensity of the educational and training process, and on their basis compare the growth rates of the complexity of programs to identify the most interspecific young gymnasts.

The task of the research. Develop and experimentally substantiate a new method of stage-by-stage control and self-control.

The essence of this method is a comprehensive self-assessment of the difficulties that gymnasts face when performing individual elements or combinations. In the process of three years of research in the national youth teams of the country, a method was

developed and tested in practice, called the “coefficient of individual difficulty” (CID), which included subjective assessments of physical difficulties (FD), technical difficulties (TD), psychological difficulties (PD) and factors of the gymnast's subjective attitude to the performed elements and combinations (CO), expressed in quantitative terms.

To help the athlete determine the degree of difficulty of the elements and combinations performed, special evaluation tables were developed that differentiate ideas about the difficulties he overcomes in all four sections of the CID. For example, we present one of them (**Table 1**).

Table 1 Auxiliary table of evaluation of technical difficulties

Estimate	Element	Combination	Estimate
Light	The technique of the element is understandable, I perform it technically correctly, easily, with pleasure.	I understand the technique of all elements and execute them correctly, easily, cheerfully. The combination is not technically difficult	0
Medium	1. The technique of the element is clear, I perform it, but not at a high level. 2. The element is obtained, but I do not understand the technique	I perform the combination at the middle level. The technique of elements is understandable, but I'm afraid of them for a long time, I especially distort the technique of individual elements when I associated them into a combination	5

Hard	<p>1. I don't understand the element's technique.</p> <p>2. The technique is clear, but I can't perform, coordinate actions</p>	<p>1. I do not understand the technique of individual elements.</p> <p>2. Individual elements and the whole combination as a whole are not obtained, although the technique is clear. And if it turns out, then at a low technical level.</p>	10
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The gymnast evaluates his attitude to difficulties, defining their degree as "light", "medium", "hard".

Technical difficulties associated with mastering or performing gymnastic elements, connections and combinations and depending on their technical complexity and coordination abilities of the gymnast ("lack of understanding of technique" and their actions) "hard" in FD, TD, PD, and "like", "something average", "dislike" - according to CO, which is translated on a scale into the number of units - respectively 0, 5, 10.

Technical difficulties associated with mastering or performing gymnastic elements, compounds and combinations and depending on their technical complexity and coordination abilities of a gymnast ("misunderstanding of technique" and their actions) are "hard" on FD, TD, PD, and "like," "something in between," "do not like" - according to CO, which is translated on a scale into the number of units - 0, 5, 10, respectively.

It is faster and easier to determine the CID by whole combinations in the all-around events, so we consider such a CID to be a simplified version. For a detailed analysis, a survey is conducted on the elements or bundles of both compulsory and free programs. Previously, the combination

is divided into elements or parts, evaluated separately, the results are summed up, and the CID is displayed as a whole according to the compulsory and free programs. We divided each combination into 7 parts (combinations of senior gymnasts contain, on average, seven of the most complex elements or combinations).

The minimum ("ideal") CID, both in terms of elements and combinations of compulsory and free programs, is equal to zero. The maximum value of CID for combinations is 210 (10 units for each of 4 factors in all 6 types of all-around events), for elements - 1920 [10 units X 8 (7 parts of the combination + combination as a whole) X 4 sections of difficulties X 6 types of all-around]. For the compulsory and free programs together, CID for combinations - 480, for elements - 3840. This is in the hypothetical case, if the gymnasts master the new program and both the elements and the combination as a whole have not been mastered, that is, "everything is difficult".

So, for example, the coefficients of individual difficulty of gymnast A (according to combinations) and gymnast B (according to elements) look like during the period of improvement of free programs by them (**Table 2**).

Table 2 Coefficients of individual difficulty of gymnasts during the period of their improvement of free programs

Types of	Gymnast A	Gymnast B
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multiple fight	PD	TD	PT	CO	CID	Place	PD	TD	PT	CO	CID	Place
Freestyle Exercises	5	5	0	0	10	5	10	15	5	10	40	6
Horse	0	10	10	5	25	2	25	20	15	20	80	3
Rings	10	0	0	5	10	4	50	20	25	0	95	1
Jumping	0	0	0	0	0	6	25	35	20	5	85	2
Bars	10	10	10	5	35	1	35	20	20	0	75	4
Crossbar	0	10	10	0	20	3	2.5	25	20	0	70	5
Total...	25	35	30	15	105	--	170	131	10	35	430	--
Place	3	1	2	4	--	--	1	2	3	4	--	--

Analyzing the subjective attitude of the gymnast; And for his free program in the types of all-around, we can draw the following conclusions: this gymnast has the lowest performance in the combination on the uneven bars (CID - 35), the best - in the jump (CID - 0). If we analyze by types of subjective difficulties (vertically), then gymnast A has poor technical readiness (TD - 35 units). The sum of CID 6 types of free program is 105.

Gymnast B has the maximum CID on the rings - 95, this apparatus is the most difficult for him. It is quite obvious that the gymnast is poorly

prepared physically, since his "physical difficulty" was 170 units.

Here, in the table, it is desirable to add the section "Difficulty of the free program in arbitrary units", adopted in gymnastics, where the elements of the highest group of difficulty are estimated at 8 units, the average group of difficulty of group "B" - at 4 and the Low group of difficulty - at 2 For gymnast A, the complexity of combinations of free programs in conventional units is as follows (Table 3).

Table 3 The complexity of the free program in conventional units

Types of multiple fight	Number of elements 12-17			Complexity in the conditional units	Place
	The highest group difficulties	Middle group difficulties	Low group difficulties		
Freestyle Exercises	4	3	15	74	2
Horse	4	4	12	72	3
Rings	4	4	4	56	4
Jumping	"tsukahara" bending over				
Bars	4	3	5	54	5
Crossbar	6	5	8	4	1
Total...	22	19	44	340	

The high complexity of the combination in conventional units does not mean that it is the most difficult to perform. CIDG provides additional information in this regard. It can be seen that the gymnast does not have such a difficult combination on the uneven bars. And from the point of view of its assessment at competitions (54 conventional units), it poses serious difficulties for the gymnast in its performance (CID is 35 - more than in other types of all-around). Naturally, when analyzing, when objective and subjective assessments are taken into account, it is easier for the coach to build the training process of a given gymnast, to decide on the development of new elements. It is advisable to carry out such self-assessment at the beginning and at the end of certain stages or periods of training, when determining the initial and final level of preparedness is of fundamental importance (for example, at the stages of mastering a new compulsory program or modernizing an arbitrary one).

This technique makes it possible to evaluate not only the compulsory and free programs of gymnasts, but also elements that are not included in these programs and are not learned by gymnasts. So, for example, for gymnast B, the coefficient of individual difficulty of the compulsory program (CIDc) is 30, the coefficient of individual difficulty of the free program (CIDp) is 20, the coefficient of individual

difficulty of the new ten elements of the highest difficulty being learned (CIDl) is 580. The complexity of the entire free program (groups "A", "B", "C") in conventional units - 340. Gymnast G. CIDc - 20, KITP - 30, CIDp of two new elements of the highest difficulty being learned - 15, the difficulty of an arbitrary program in conventional units - 280. Who has the most intense training process? Naturally, gymnast V. With approximately equal CIDc and CIDp, his free program is more difficult - 340 versus 280 conventional units, and CIDl - 580 versus 15, since he learns eight elements of higher difficulty more than gymnast G in this period. It can be concluded that when planning the load, the coach must take into account the higher intensity of the training program of gymnast V.

Using this technique, it is possible to trace the intensity of the training process and the dynamics of the "growth" of the gymnast over the periods of training. This tension is most clearly seen in the example of combinations of a free program of a member of the national team of the country A.A., whom we tested for two years (**Table 4**).

Periods of increase and decrease in the coefficient of individual difficulty are associated with periodic updating and complication of a free program, with the inclusion of new elements in combinations.

Table 4 The intensity of the training process and the dynamics of the "growth" of the gymnast by periods of training

Date of inspection	CIDp	Complexity of the program (conventional units)
December 2018 y.	45	288
March 2019 y.	95	340
June 2019 y.	50	340
September 2019 y.	35	340

December 2019 y.	20	340
January 2020 y.	85	398
March 2020 y.	40	398
September 2020 y.	90	414
December 2020 y.	35	414

Individual difficulties are associated with periodic updating and complication of an arbitrary program, with the inclusion of new elements in combinations. So, in March 2017, A.A. complicated his program from 288 to 340 conventional units, CIDp, respectively, increased from 45 to 95. Consequently, the intensity of the training process also increased. A period of temporary stabilization of the complexity of the free program and improvement in the quality of performance has begun. And in December 2017, CIDp decreased to 20. As soon as the test results determined a decrease in training intensity, in January 2018, the gymnast again complicated the program. So, in stages, the complexity of the program A.A. was brought to 414 conventional units, and he was included in the main team of the country.

Such fluctuations in the CID are typical for young gymnasts in the period of the formation of sportsmanship. At the same time, in the process of research, we also noted cases when promising gymnasts, such as A. A. (now one of the leading gymnasts in the world), P. S. and A. P., in certain periods had CID equal to 0, which testified to the complete absence of difficulties in the development and implementation of the program.

This technique can also be used to compare the assessment of training loads by the coach and the student. Studies have shown that such an assessment is often not the same. Usually the coach rates his student's CID lower. There is a particularly noticeable discrepancy in the assessment of difficulties on horseback and in the overall assessment of physical difficulties (**Table 5**).

Table 5 General assessment of the physical difficulty of the free gymnast programs

Types of multiple fight	Gymnast A. A.						Coach B. P.					
	PD	TD	PT	CO	CID	Place	PD	TD	PT	CO	CID	Place
According to the elements of the free program												
Freestyle Exercises	10	15	5	10	40	6	20	5	10	10	45	5
Horse	25	20	15	20	80	3	5	10	10	0	25	6
Rings	50	20	25	0	95	1	35	20	10	0	65	3
Jumping	25	35	20	5	85	2	25	30	35	0	90	1

Bars	35	20	20	0	75	4	25	35	25	0	85	2
Crossbar	20	25	25	0	70	5	10	25	25	0	60	4
Total...	165	131	110	35	445	--	120	125	115	10	370	--
Place	1	2	3	4	--	--	2	1	3	4	--	--

Comparison of the student and coach survey data will allow more reasonably to determine the weakest points in the fitness of the gymnast.

In order to use this method of self-control in the future, it was tested as a test for compliance with the criteria for standardization of tests: reliability, informativeness, normativity.

Reliability was determined by the method of double testing, and information content was determined by the magnitude of the correlation with the

sports result. The reliability coefficient of the test is 0.925 (by elements) and 0.971 (by combinations), the informative coefficient is 0.897 (by elements) and 0.940 (by combinations).

As a result of systematic three-year observations of the gymnasts of the youth and youth national teams of the country and candidates for their composition, as well as in the national teams of the CIS countries (155 people), a scale for assessing the intensity of the training process was compiled (**Table 6**).

Table 6 Scale for assessing the intensity of the training process

Indicators	10.0-9.5	9.5-9.0	9.0-8.5	8.5-8.0	8.0-7.0	7.0-6.0	6,0 and below
CID by combinations	0-20	20-50	50-90	90-130	130-170	170-210	2,10-240
CID by elements элементам	0-50	50-200	200-400	400-700	700-1100	1100-1500	1500-1920
Grade of level readiness	The highest	High	High Middle	Medium	Below Middle средней	Low	The lowest

When compiling it, the principle of regressing scales was used. The scale makes it possible to assess the intensity of the training process at any stage of training, taking into account the value of CID, to determine the level of an athlete's readiness to compete and predict the result.

To test the effectiveness of the proposed method of control (self-control) in practice, during the period of mastering the new compulsory program by the gymnasts, a one-year pedagogical experiment was organized.

The experiment involved two groups of qualified athletes aged 15-18, 15 people each. Gymnasts of the experimental group (EG) were tested four times (during the year) during the period of centralized training. After each test on CID, on the basis of its analysis and comparison with the rating scale, the athlete was given practical recommendations on how to eliminate the identified difficulties. The gymnasts of the control group (CG) were not tested during the year.

At the beginning of the experiment, athletes

of the experimental and control groups did not have significant differences between themselves in terms of average group indicators, both in terms of CID and sports results. At the end of the experiment, the CID index among the gymnasts of both groups decreased significantly: in the experimental group by 170%, in the control group by 90% by a statistically significant level in both cases. According to the sections of CID, the largest decrease was noted in indicators characterizing physical and technical difficulties, both in the experimental (by 26.5 and 28.5, respectively) and in the control (by 17.5 and 16.5) groups.

The competitions held at the end of the experiment showed that the sports and technical result in the all-around increased over the same time in the EG by 7.25 points (15.9%), in the CG - by 5.3 points (10%). Comparison of the groups at the end of the experiment revealed that they differed significantly in terms of CID and sports and technical results.

The effectiveness of this technique is due to more timely targeted control and adjustment of the training process based on the subjective assessment of the difficulties that gymnasts face when performing gymnastic exercises.

CONCLUSIONS

1. The proposed method for assessing the difficulties that gymnasts face when performing gymnastic exercises in all-around types, systematically, step by step, for a long time controlling the same athletes using this method, will allow not only to identify their readiness at the moment, but also to determine intensity of the training process.

2. On the basis of the results of the control tests, it is possible not only to determine the level of individual physical, technical and psychological difficulty of the program requirements, but also to compare the growth rates of the complexity of the programs for different gymnasts to identify the most promising ones. This makes it possible for the coach and the gymnast to adjust the load parameters and predict the sports result, to increase the efficiency of the gymnasts' training process management.

3. The methodology developed and proposed for practice in training promising young

gymnasts allows not only to evaluate the free program of gymnasts, but also elements, connections and connections not included in these programs, not learned by gymnasts.

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