



IMPROVING THE SYSTEM FOR ASSESSMENT OF SPECIAL PHYSICAL PREPARATION OF 11-12 YEAR OLD MALE COMPETITORS IN ARTISTIC GYMNASTICS

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ABSTRACT

The main purpose is to improve sports training in gymnastics. at the stage of initial sports specialization. This stage is characterized by mastering the basic elements in artistic gymnastics, This implies raising the level of special physical preparation. This article discusses the issue of special physical preparation of gymnasts. Its planning, assessment and reporting is part of the management of the training process. **AIM.** On the basis of 38 tested 11 - 12 year old male gymnasts with 14 tests to design a 50-grade scale for assessment of special physical preparation along the different tests. **METHODS.** The methods we used are: testing, registration, analysis, statistical methods (variation analysis, sigma method). **RESULTS.** The obtained results will be interesting for the specialists because they constitute a contemporary database, which was not available in the past. The normative tables allow for a short-time, effective assessment of each competitor for the respective indicator immediately after his testing. **CONCLUSIONS.** The normative tables will achieve a more focused and rational management of the training process by improving the system for control and evaluation of special physical preparation at each stage of athletes' training proses.

Key words: artistic gymnastics, specific physical preparation, assessment, normative tables.

INTRODUCTION

One of the main objectives of this paper is to perfect artistic gymnastics sports training during the initial sports specialization stage Tracing the development and evaluation of the components of sports training at all stages of gymnasts' preparation ensures the quality of the training and guarantees high achievements.. We believe that on this basis a more purposeful and rational management of an education-training process will be achieved as regards the different components of sports training in male artistic

gymnastics. The system of control and evaluation of competitors' special physical preparation will also be perfected as regards the development of their motor qualities. This manuscript deals with the issue of the special physical preparation which is directly related to the technical preparation (1, 2). Control, being part of the mechanism of sports training management is an irreplaceable factor related to the successful planning and management of the education-training process in gymnastics (3). Different authors are of the opinion (4-8) it is an irreplaceable part of the training process as regards its planning (9) and control (10-14). The control of the special physical preparation is expressed mainly through tests. The tests used are exercises related to the specificity and contents of competitive routines and to gymnasts'

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preparation during the different periods of multi-year sports preparation (12). These are basic exercises for the different apparatuses and are the basis for learning the more complex exercises in artistic gymnastics.

PURPOSE

The aim of the research is updating the system for control and evaluation of young male gymnasts' special physical preparation. The main **tasks** were: to select suitable tests for evaluation of the special physical preparation and; to carry out testing with competitors in order to design a 50-grade scale for evaluation of special physical preparation along the different indexes (tests).

Subject of the research: special physical preparation. **Object** of the research: The different indexes (tests) providing information about the level of development of the special physical preparation. The research was done among thirty-eight 11-12-year-old male gymnasts.

Organization of the research. We present the organization of the research along its different stages which follow the above-mentioned tasks:

Stage one – 1.01.2014 – 1.03.2014 - During the first stage we analyzed and selected the tests needed for the quality evaluation of the special

physical preparation. The analysis and selection of the special physical preparation tests (14 tests) were done on the basis of the level of modern artistic gymnastics and the requirements competitors face as regards the execution of the exercises on the different apparatuses. **Stage two** – 2.03.2014 – 1.06. 2015 - During this stage we carried out the testing with the 38 male 11-12 years old competitors. **Stage three** -2.06. 2015r – 01.09.2015 – during this stage we analyzed the results from the testing and designed normative tables for control and evaluation of the different tests/indexes along a 50-grade (point) scale.

METHODS

We used the following research methods: Analysis and synthesis of the movements; sports-pedagogical testing; math statistical methods.

In order to design the normative tables, we used the method of the sigma digressions. According to this method for evaluation of the condition of the researched subjects, the evaluated index is compared with the average level of the same index. The main characteristics used are mean arithmetical value and standard deviation (15). **Table 1** shows the tests providing information about the level of special physical preparation.

Table 1. List of indexes /tests/characterizing special physical preparation

	Tests /Indexes/	Units	Accuracy of measurement	Direction of increase
1.	Floor – Saltos backwards tucked	number / 15 sec	1.0	+
2.	floor – from standing – Back handsprings	number	1.0	+
3.	Pommel horse – Circles in cross support frontways	number	1.0	+
4.	Pommel horse – Scissors forward	number	1.0	+
5.	Pommel horse - Circles in side support	number	1.0	+
6.	Rings – Hanging scale frontways (front lever) (hold)	sec	0.01	+
7.	Rings – Hanging scale rearways (back lever) (hold)	sec	0.01	+
8.	Rings – Handstand (hold)	sec	0.01	+
9.	Rings – V-sit. * (hold)	sec	0.01	+
10.	Parallel Bars – Forward uprise to support	number	1.0	+
11.	Parallel Bars – Backward uprise to support	number	1.0	+
12.	Parallel Bars – Swing bwd. to handstand with ½ turn	number	1.0	+
13.	Parallel Bars – Swing bwd. with ½ turn backwards in handstand	number	1.0	+
14.	High Bar – Swing forward with ½ turn	number	1.0	+

*Note: Test №9: The test starts in the V-sit position, when fatigue occurs the legs start to fall, the stopwatch does not stop, The stopwatch stops when the feet fall below the horizontal level in the L-sit position.

RESULTS AND DISCUSSION

Table 2 shows the results from the variation analysis. We were predominantly interested in the analysis of the results from the coefficient of variation (V%), which shows the homogeneity of the group. According to the coefficient of

variation, the group was strongly non-homogeneous ($V > 20\%$) along all tests. Taking the range ($R = \max - \min$) into account, we can say this allows for an accurate design of normative tables which can contain both low and high results.

Table 2. Indexes of special physical preparation – 11-12-year-old gymnasts

№	Indexes/Parameters	X	S	V%	min	max	As	Ex
1.	Floor – Saltos backwards tucked	8,21	2,64	32,12	2	11	-1,11	0,37
2.	floor – from standing – Back handsprings	7,32	3,06	41,77	1	11	-1,14	0,37
3.	Pommel horse – Circles in cross support frontways	28,74	16,57	57,67	3	59	0,33	-0,63
4.	Pommel horse – Scissors forward	23,42	14,82	63,29	4	60	1,23	1,34
5.	Pommel horse - Circles in side support	17,68	10,69	60,44	1	38	-0,07	-0,78
6.	Rings – Hanging scale frontways (front lever) (hold)	1,05	2,27	215,88	0	8	2,18	4,23
7.	Rings – Hanging scale rearways (back lever) (hold)	10,49	4,51	42,96	3	19,02	0,20	-0,57
8.	Rings – Handstand (hold)	10,57	12,30	116,34	0	43	1,77	2,18
9.	Rings – V-sit. (hold)	35,31	15,22	43,09	11	79,2	1,21	2,86
10.	Parallel Bars – Forward uprise to support	16,26	6,85	42,10	5	30	0,43	0,14
11.	Parallel Bars – Backward uprise to support	11,68	6,55	56,05	0	24	0,11	-0,62
12.	Parallel Bars – Swing bwd. to handstand with ½ turn	5,68	4,33	76,25	0	15	0,52	-0,32
13.	Parallel Bars – Swing bwd. with ½ turn bwd in handstand	0,66	0,82	123,14	0	3	1,46	2,51
14.	High Bar – Swing forward with ½ turn	6,37	7,17	112,65	0	21	1,11	-0,16

The specifications for each index are shown in **Table 3**. They are distributed in a 50-grade scale. The competitor receives certain number of points for each achievement.

The sigma method for evaluation enables the quantitative evaluation of the condition of the researched indexes. The values are calculated on the basis of the average level of each of the researched combinations which is a prerequisite for the design of specification tables for control over sports preparation. The received values are specified and presented in 50-grade point system (from 1.0 to 50.0 – with 1.0 in between). This enables the comparison of the achievements along different tests and indexes measured in sec, m, kg, number, etc. The average level is 25 points. In case a higher quality (e.g. time for

running a distance) corresponds to a lower value of the result along a certain index, the scale is reversed (16).

The normative tables provide us with the opportunity to quickly evaluate a certain individual along a particular index right after the testing. Also, the 50-grade point system enables the evaluation of a smaller increase in the achievements, which practically affects, on the one hand, the optimal management of the training process, and on the other hand, influences positively athletes' motivation. For example: test № 6 – if the competitors have achieved a result of 4.68 sec, they get 41 points. If needed, the results from the tests are made even in favor of a competitor (in an upward direction).

Table 3. Normative table - 11-12-year-old Male Gymnasts

Points	Test 1. (n/15sec)	Test 2. (n)	Test 3. (n)	Test 4. (n)	Test 5. (n)	Test 6. (sec)	Test 7. (sec)
50	11,96	12,07	63,49	60,47	40,43	6,73	19,24
49	11,81	11,88	62,10	58,99	39,52	6,50	18,89
48	11,66	11,69	60,71	57,51	38,61	6,27	18,54
47	11,51	11,50	59,32	56,03	37,70	6,05	18,19
46	11,36	11,31	57,93	54,54	36,79	5,82	17,84
45	11,21	11,12	56,54	53,06	35,88	5,59	17,49
44	11,06	10,93	55,15	51,58	34,97	5,37	17,14
43	10,91	10,74	53,76	50,10	34,06	5,14	16,79
42	10,76	10,55	52,37	48,62	33,15	4,91	16,44
41	10,61	10,36	50,98	47,13	32,24	4,68	16,09
40	10,46	10,17	49,59	45,65	31,33	4,46	15,74
39	10,31	9,98	48,20	44,17	30,42	4,23	15,39
38	10,16	9,79	46,81	42,69	29,51	4,00	15,04
37	10,01	9,60	45,42	41,21	28,60	3,78	14,69
36	9,86	9,41	44,03	39,72	27,69	3,55	14,34
35	9,71	9,22	42,64	38,24	26,78	3,32	13,99
34	9,56	9,03	41,25	36,76	25,87	3,10	13,64
33	9,41	8,84	39,86	35,28	24,96	2,87	13,29
32	9,26	8,65	38,47	33,80	24,05	2,64	12,94
31	9,11	8,46	37,08	32,31	23,14	2,41	12,59
30	8,96	8,27	35,69	30,83	22,23	2,19	12,24
29	8,81	8,08	34,30	29,35	21,32	1,96	11,89
28	8,66	7,89	32,91	27,87	20,41	1,73	11,54
27	8,51	7,70	31,52	26,39	19,50	1,51	11,19
26	8,36	7,51	30,13	24,90	18,59	1,28	10,84
25	8,21	7,32	28,74	23,42	17,68	1,05	10,49
24	8,05	7,13	27,35	22,52	16,97	1,01	10,14
23	7,89	6,94	26,44	21,62	16,26	0,96	9,79
22	7,73	6,75	25,29	20,72	15,55	0,92	9,44
21	7,57	6,56	24,14	19,82	14,84	0,88	9,09
20	7,41	6,37	22,99	18,92	14,13	0,83	8,74
19	7,25	6,18	21,84	18,02	13,42	0,79	8,39
18	7,09	5,99	20,69	17,12	12,71	0,74	8,04
17	6,93	5,80	19,54	16,22	12,00	0,70	7,69
16	6,77	5,61	18,39	15,32	11,29	0,66	7,34
15	6,60	5,42	17,24	14,42	10,58	0,61	6,99
14	6,43	5,23	16,09	13,52	9,87	0,57	6,64
13	6,26	5,04	14,94	12,62	9,16	0,52	6,29
12	6,09	4,85	13,79	11,72	8,45	0,48	5,94
11	5,92	4,66	12,64	10,82	7,74	0,44	5,59
10	5,75	4,47	11,49	9,92	7,03	0,39	5,24
9	5,58	4,28	10,34	9,02	6,32	0,35	4,89
8	5,41	4,09	9,19	8,12	5,61	0,30	4,54
7	5,23	3,90	8,04	7,22	4,90	0,26	4,19
6	5,06	3,71	6,89	6,32	4,19	0,22	3,84
5	4,88	3,52	5,74	5,42	3,48	0,17	3,49
4	4,71	3,33	4,59	4,52	2,77	0,13	3,14
3	4,53	3,14	3,44	3,62	2,06	0,08	2,79
2	4,36	2,95	2,29	2,72	1,35	0,04	2,44
1	4,18	2,76	1,14	1,82	0,64	0,00	2,09

Points	Test 8. (sec)	Test 9. (sec)	Test 10. (n)	Test 11. (n)	Test 12. (n)	Test 13. (n)	Test 14. (n)
50	41,32	73,36	33,26	25,43	16,43	2,71	23,62
49	40,09	71,84	32,58	24,88	16,00	2,63	22,93
48	38,86	70,32	31,90	24,33	15,57	2,55	22,24
47	37,63	68,80	31,22	23,78	15,14	2,47	21,55
46	36,40	67,27	30,54	23,23	14,71	2,39	20,86
45	35,17	65,75	29,86	22,68	14,28	2,30	20,17
44	33,94	64,23	29,18	22,13	13,85	2,22	19,48
43	32,71	62,71	28,50	21,58	13,42	2,14	18,79
42	31,48	61,19	27,82	21,03	12,99	2,06	18,10
41	30,25	59,66	27,14	20,48	12,56	1,98	17,41
40	29,02	58,14	26,46	19,93	12,13	1,89	16,72
39	27,79	56,62	25,78	19,38	11,70	1,81	16,03
38	26,56	55,10	25,10	18,83	11,27	1,73	15,34
37	25,33	53,58	24,42	18,28	10,84	1,65	14,65
36	24,10	52,05	23,74	17,73	10,41	1,57	13,96
35	22,87	50,53	23,06	17,18	9,98	1,48	13,27
34	21,64	49,01	22,38	16,63	9,55	1,40	12,58
33	20,41	47,49	21,70	16,08	9,12	1,32	11,89
32	19,18	45,97	21,02	15,53	8,69	1,24	11,20
31	17,95	44,44	20,34	14,98	8,26	1,16	10,51
30	16,72	42,92	19,66	14,43	7,83	1,07	9,82
29	15,49	41,40	18,98	13,88	7,40	0,99	9,13
28	14,26	39,88	18,30	13,33	6,97	0,91	8,44
27	13,03	38,36	17,62	12,78	6,54	0,83	7,75
26	11,80	36,83	16,94	12,23	6,11	0,75	7,06
25	10,57	35,31	16,26	11,68	5,68	0,66	6,37
24	10,04	33,99	15,67	11,13	5,39	0,63	6,07
23	9,51	32,67	15,08	10,58	5,10	0,59	5,77
22	8,98	31,35	14,49	10,03	4,81	0,56	5,47
21	8,45	30,03	13,90	9,48	4,52	0,52	5,17
20	7,92	28,71	13,31	8,93	4,27	0,49	4,89
19	7,42	27,39	12,72	8,38	4,02	0,46	4,61
18	6,92	26,07	12,13	7,83	3,77	0,43	4,33
17	6,42	24,75	11,54	7,28	3,52	0,40	4,05
16	5,92	23,43	10,95	6,73	3,27	0,37	3,77
15	5,47	22,21	10,36	6,28	3,04	0,35	3,49
14	5,02	20,99	9,77	5,83	2,81	0,32	3,24
13	4,57	19,77	9,18	5,38	2,58	0,30	2,99
12	4,12	18,55	8,59	4,93	2,35	0,27	2,74
11	3,67	17,33	8,00	4,48	2,12	0,25	2,49
10	3,28	16,21	7,41	4,03	1,91	0,22	2,24
9	2,89	15,09	6,82	3,58	1,70	0,20	1,99
8	2,50	13,97	6,23	3,13	1,49	0,17	1,74
7	2,11	12,85	5,64	2,68	1,28	0,15	1,49
6	1,72	11,73	5,05	2,23	1,07	0,12	1,24
5	1,35	10,61	4,46	1,78	0,86	0,10	0,99
4	0,98	9,49	3,87	1,33	0,65	0,07	0,74
3	0,61	8,37	3,28	0,88	0,44	0,05	0,49
2	0,24	7,25	2,69	0,43	0,23	0,02	0,24
1	0,00	6,13	2,10	0,00	0,02	0,00	0,00

There are a few options for calculation of the total score on the basis of all indexes of special physical preparation:

- ✓ The sum of the number of points received along all indexes. Thus, the maximum number of points is 700 points.
- ✓ The use of an average score index – mean arithmetic value – the total number of points from all the tests is divided by 14. Thus, the maximum number of points is 50.
- ✓ The third approach requires more profound studies. We should establish the factor weight of each index, i.e., every index will have a different weight when forming the total grade. However, this will be subject of future research.

At this stage, we can successfully use the first two options for calculation of the total score for evaluating the special physical preparation.

CONCLUSIONS

The obtained results are interesting for the specialists as a database, which was not available in the past. The results from the tests will help upgrading the normative tables for observing, tracing of the improvement and evaluation of the special physical preparation. Based on the testing, collected information and specification tables made we can improve the management and evaluation of the temporary state of competitors' special physical preparation at each stage of the preparation. We will also be able to evaluate (notice) the smallest changes (increase) in the indexes during the preparation both in positive and negative aspect.

In conclusion we can say that gathering more data (testing) will allow the precision of these normative tables so that they could become more informative. Because the researched individuals are some of the best in the age group 11-12 years, we can claim that the results from the tests can be considered model characteristics for the gymnasts of this age (11-12) as regards special physical preparation.

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