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IMPACT OF SAMPLE FLEXIBILITY METHODS IN SPORTS PREPARATION OF 19-22-YEAR-OLD WRESTLERS

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ABSTRACT

Our research was aimed at revealing the influence of sample, author stretching methods for development and maintenance of the physical quality flexibility among greco-roman wrestlers.

Aim. We wanted to examine the influence of the implementation of sample flexibility exercises in the educational-training process of a particular sample of wrestlers on their general and special flexibility.

Methods. In order to collect and process the data needed to conduct the research we used the following methods – pedagogical experiment; testing; math-statistical processing of the obtained data – variation analysis (for determining the normality of the distribution of the data), t-criterion of Student for independent samples. The results were processed with MS Excel 2016.

Results. The results from the variation analysis of the control and experimental groups are presented in tables with the values of each index. Both groups were homogeneous and relatively homogeneous as regards the tests used, and according to the indexes for asymmetry and excess, we can summarize that the distribution of the data was symmetrical. The last table shows the comparison between the mean values at the beginning and at the end of the experiment for both the control and the experimental groups.

Conclusion. In conclusion, we point out the necessity of purposeful inclusion of flexibility exercises in wrestlers' training process because they help maintaining and increasing the physical quality flexibility, which on the other hand, is a premise for the successful learning and applying certain technical elements and holds in sports wrestling.

Key words: wrestling, sports preparation, physical qualities, flexibility

INTRODUCTION

At the current stage of the development of free-style wrestling, achieving high results is impossible without a purposeful and regular multi-year sports training based on scientific grounds. In order to apply successfully a certain technical action, known in wrestling as a hold, a wrestler should possess the required motor qualities – strength, speed, endurance, flexibility, and agility. Since ancient times stretching and development of flexibility have been used for different purposes (8).

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The roots of the development of flexibility as a purposeful training method have not been identified. It is known, however, that ancient Greeks used some forms of training for development of flexibility which enabled them to dance, perform some acrobatic exercises, fight more easily (9).

A lot of authors have their own views and surveys about flexibility as one of the main motor qualities of humans. Some of them define flexibility as the ability to perform movements with great amplitude at the joints of the human body (2-6). Others think this definition is not exactly correct (1), because every human has their own individual scope of movement at a certain joint, which for them is the maximum.

Wrestling is a sport with special requirements for the quality flexibility. Movability of all joints is of great importance for the training sessions and competitions, but the movability of the coxofemoral joints is the most important (7). Also, we observe a great potential in the forecast for the dynamics and development both of the technical preparation of the wrestlers and of the results from their physical preparation. Predicting the influence of different factors on flexibility of athletes and of wrestlers, in particular, is a complicated process. Neuron net is an innovative instrument for analysis of these types of processes. It offers effective solutions to both data description and tasks solutions for making a forecast (10).

After an extensive research of accessible literary sources, we concluded it was necessary to include flexibility exercises in at least one training session per training week (usually one micro cycle). On the basis of the contents of training activities, we implemented a sample program with the experimental group (EG). This program is geared and directed mainly to the major joints, important in sports wrestling, the loaded muscles and muscle groups during the main part of the training session **(Figures 1-9).**

Figure 1. Arms extended to the sides, back bend sidewards to the left/to the right.

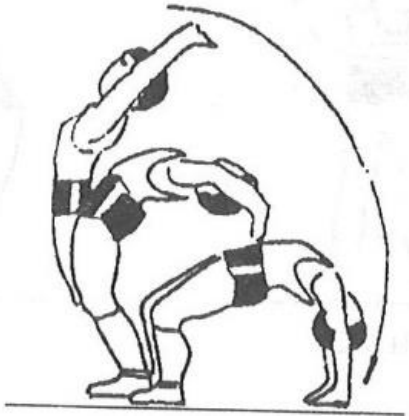

Figure 2. Back bend to bridge.

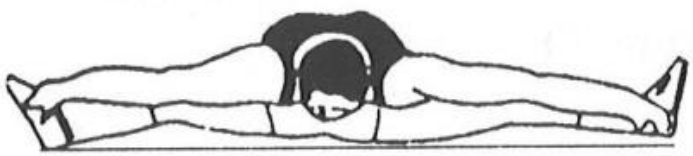

Figure 3. Bend from straddle sit, arms extended to the sides.

Figure 4. Knee sit – bend backwards to lying position.

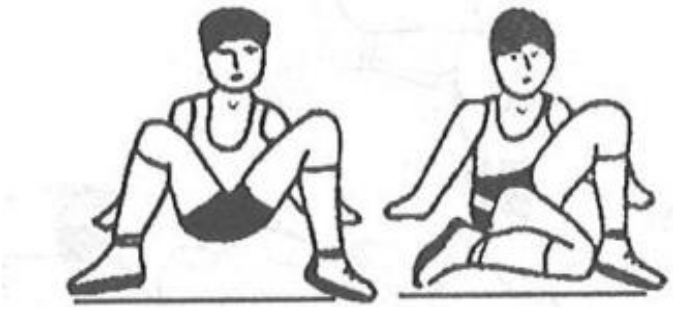

Figure 5. Straddle sit with bent knees – left/right knee support.

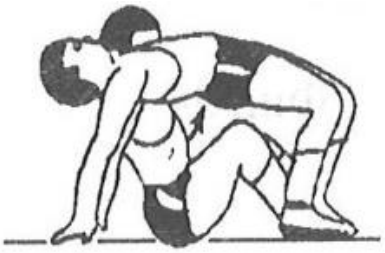

Figure 6. Straddle sit with bent knees – shoulder and knee support.

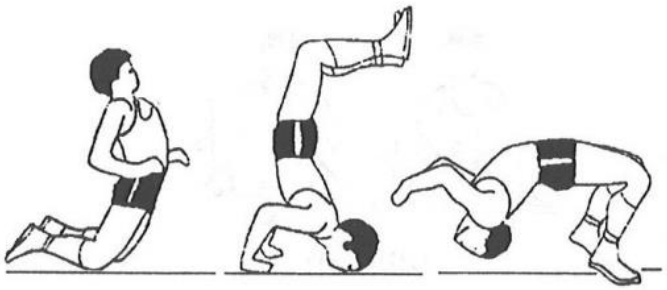

Figure 7. Foreward roll to handstand – lowering to wrestling bridge.

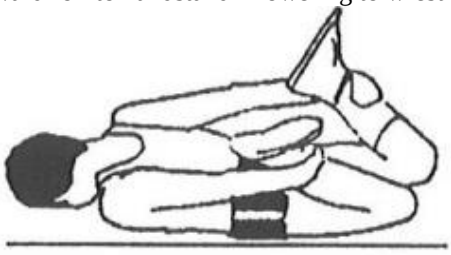

Figure 8. Lying position with arms down – raising shins backwards with ankle grip.

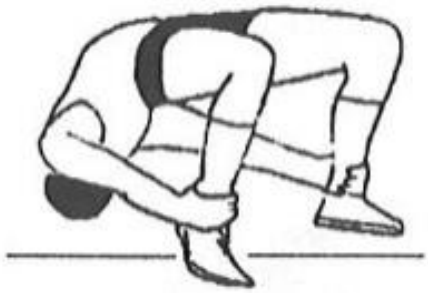

Figure 9. Straddle wrestling bridge with hands holding lower limbs.

The experimental group consisted of 27 full-time students from NSA "Vassil Levski", Sofia. They study at Faculties Sport and Physical Education and major in Greco-Roman wrestling. They compete at the wrestling club "NSA – Academic"; age group adolescents and men (19-22-year-old). The above-mentioned exercises were included in the training process during the preparatory period of academic year 2015/16.
The control group (CG) consisted of 24 Greco-Roman wrestlers from sports club "Levski", Sofia from the same age groups

In line with the accessible literature and our own experience, we selected the following tests for measuring the flexibility in the different joints, important in wrestling:

1. Height of the wrestling bridge
2. Length of the wrestling bridge
3. Depth of the bend from standing position
4. Depth of the bend in sitting position

Table 1. *Test battery implemented in the pedagogical experiment*

№	Test	What is measured	Unit of measurement	Methodological guidelines	Meaning of the data
1.	Height of the wrestling bridge	Special flexibility of spinal column	cm	Solid stand, on flat feet	The higher the value, the better
2.	Length of the wrestling bridge	Special flexibility of spinal column	cm	Solid stand, on flat feet	The lower the value, the better
3.	Bend "standing"	General flexibility of coxofemoral joints and spinal column	cm	Execute with ease, straight knees	The higher the value, the better
4.	Bend "sitting"	General flexibility of coxofemoral joints and spinal column	cm	Execute with ease, straight knees	The higher the value, the better

RESULTS

Table 2 shows the results from the variation analysis of the control group. We can see the minimal and maximal values for each test as well as the mean values of the researched individuals. The indicators for dispersion – standard deviation (**S**) and coefficient of variance (**V%**) provide a quantity characteristic of the trend for digression of the values from the typical, average level.

Table 2. *Variation analysis of the control group*

№	Indicators	n	min.	max.	$\overline{X}$	s	V%	As	Ex
1	Height of wrestling bridge	24	36,0	51,0	42,2	3,76	8,9	,490	-,342
2	Length of wrestling bridge	24	35,0	66,0	54,3	8,08	14,9	-,234	-,223
3	Bend "standing"	24	44,0	64,0	54,7	5,78	10,6	,060	-1,035
4	Bend "sitting"	24	40,0	68,0	56,8	7,63	13,4	-,490	-,511

From the received data about the coefficient of variance it is clear that the control group was homogeneous as regards most of the tests, since the value of **V%** was within 10-12%. The sample was relatively homogeneous as regards tests 2 and 4 because the values were within 10 and 30% - namely 14.9%, 13.4%. As for the criteria for asymmetry (**As**) and excess (**Ex**), we can sum up the following: according to the table value of the criterion **As** and the volume of the sample, we can assume that the distribution of the empirical data was symmetrical (**Asemp< Asα)**, because the critical value of **Asα** is 0.711 at a significance level α=0.05. The data in the table show that the values of this criterion was below this value in all the tests. The empirical values of the criterion **Exemp** were also lower the critical one (**Exα=** 0.869) except one test – bend "standing" where the value was -1.035.

Table 3 shows the results from the variation analysis of the experimental group (EG).

Table 3. *Variation analysis of the experimental group*

№	Indicators	n	min.	max.	$\overline{X}$	s	V%	As	Ex
1	Height of wrestling bridge	27	32,00	56,00	44,00	6,84	15,55	,343	-,392
2	Length of wrestling bridge	27	41,00	72,00	56,50	8,83	15,63	,204	-,819
3	Bend "standing"	27	45,00	70,00	57,50	6,02	10,47	,621	,439
4	Bend "sitting"	27	49,00	71,00	60,00	5,49	9,15	,735	,223

Table 4 shows the data we are interested in for checking the hypotheses when having two independent samples – CG and EG.

Table 4. Results from experiment checking difference reliability between CG and EG (initial)

№	Indicators	Control		Experimental		D	D%	t_{emp}	P%
	Test	$\overline{X}_1$	s	$\overline{X}_2$	s				
1	Height of wrestling bridge	42,2	3,76	43,2	6,84	1,0	2,61	,645	47.8
2	Length of wrestling bridge	54,3	8,08	55,4	8,83	1,1	2,03	,467	35,7
3	Bend "standing"	54,7	5,78	55,2	6,02	0,5	0,91	,313	24,4
4	Bend "sitting"	56,8	7,63	57,5	5,49	0,7	1,23	,394	30,4

We used t-criterion of Student for independent samples and calculated the mean asymmetry ($\overline{X}_1$ and $\overline{X}_2$) and dispersions (**S**) of the two samples, as well as the empirical values of the relevant criterion ($\mathbf{t_{emp}}$). The differences in the mean values of the control group and experimental group were also provided in absolute values (**D**) and as a percentage (**D%**).

Table 5 shows the results from the comparison of the mean values at the end of the pedagogical experiment between two independent samples, i.e., CG and EC. In the

stub column designated as **D** we can see the difference in the increase for CG and EG, and the stub column (**D%**) shows the calculated percentage for making a more convenient comparison.

Table 5. *Results from experiment checking difference reliability between CG and EG (final)*

№	Indicators	Control		Experimental		D	D%	t_{emp}	P%
	Test	$\overline{X}_1$	s	$\overline{X}_2$	s				
1	Height of wrestling bridge	41,0	3,84	45,3	6,60	4,3	10,49	2,818	99,3
2	Length of wrestling bridge	55,7	7,87	54,1	8,74	1,6	2,87	,683	50,2
3	Bend “standing”	53,5	5,56	55,2	11,65	1,8	3,36	,646	44,8
4	Bend “sitting”	54,6	7,16	59,4	5,73	4,8	8,80	2,627	98,9

We can see that the greatest difference is observed in tests 1 and 4 – 10.49% and 8.80%, respectively. There was obviously a greater increase compared to the mean values in the initial testing of the two groups.

DISCUSSION

The results and the approach used in the analysis of the data from the testing battery from the conducted pedagogical experiment can be applied in the practical work of coaches. They will be able to maintain their wrestlers’ general and special flexibility as a prerequisite for successful learning and applying elements from wrestling technique and different holds requiring a high level of this physical quality. When comparing the results of the two groups, we can see from the tests of the experimental group that there was a significant improvement in the measured indicator, while the increase was smaller in the control group. There was even a reduction in the mean values in some of the tests. Therefore, we recommend that the educational process include not only the traditional methods and means but also purposefully selected flexibility exercises.

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