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STUDY ON THE INFLUENCE OF MORPHOLOGICAL PARAMETERS THROUGH THE METHODICAL PROCEDURES OF STRENGTH DEVELOPMENT AT THE AGE OF 14-15 YEARS

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Abstract:

The use of 12 variants of medium extensive circuits in the physical education lesson, for 8 months, 2 times a week, for 16 minutes each (total volume 512 minutes), at the age of 14-15 years, will influence the modification of the main morphological parameters of the subjects included in the experiment.

Introduction

Preparing a circuit to work with for a certain period requires intense, persistent work from the teacher, and from the students a conscious understanding of the advantages and an active participation. The selection and establishment of the means included in the structure of the circuit, the working time and the breaks according to the intended purpose (the development of one or more motor qualities, the consolidation of some basic or specific motor skills) [2,6]

The sequence of the means should be done in such a way as to alternate the effort engagement of the main muscle groups. It is recommended that the difficulty of the means (exercises), in terms of "weight", "intensity",to increase progressively along the circuit [3,4,5]

Matherial and method

The experiment consisted in the use of 12 variants of medium extensive circuits in the physical education lesson, for 8 months, 2 times a week, for 16 minutes each (total volume 512 minutes), at the age of 14-15 years, will influence the modification of the main morphological parameters of the subjects included in the research.

First, the research samples were established: the control group and the experiment group with a total number of 50 students (25 control group and 25 experiment group, and the gender distribution being 13 boys and 12 girls).

With the experiment group (8th B) we worked differently according to the selected content and planned, while in the control group (8th A) "traditional" means provided in the drive units/systems were used for the development of the strength motor quality. Both in the experimental group and in the control group, the methods and means were used respecting the annual and semi-annual plans, as well

as the structure of the physical education lesson, the development of the motor quality of strength, having as its location the sixth link of the lesson. [2,3,4]

Then followed the recording of initial and final measurements and tests in order to be able to compare their evolution and reporting to reference anthropometric indices, as well as the level of manifestation of motor quality, strength, correlated with the requirements of the National School Evaluation System. The following tests were used: the Ruffier test, the Bouchard corpulence index and the Adrian Ionescu proportionality index. [1,7,8,9]

The means used in the experiment were the following:

- 3 variants of medium extensive circuit performed freely (8 stations)
- 3 medium extensive circuit variants including exercises with a partner (8 stations)
- 3 variants of medium extensive circuit with weights of 0.5kg (plastic bottles filled with sand), medicine ball (0.5kg), rope (8 stations).
- 3 variants of the circuit with exercises for the development of explosive strength-relaxation at the level of the lower and upper limbs (8 stations)

The dosage structure during the experiment was as follows:

Dosage: Reference time: 16 minutes;

Circuit duration: 4 minutes;

Number of repetitions: 2x4 minutes;

Working time: 30 seconds;

Break between stations (semi-active): 30 seconds; total break: 8 minutes.

Rest between repetitions: 1 minute. [9, 10]

Results

Table 1. Centralizing table with physiological parameters (I- initial,F-final,D-the difference) - Experiment group: class

Morphological indicator	Ruffier test			The Bouchard corpulence index (grams)			Adrian Ionescu proportionality index (cm)		
Name and surname	I	F	D	I	F	D	I	F	D
1.A.C.I.	10	8	2	321,21	329,34	8,13	15,5	15,5	0
2.A.E.	9	5	4	337,34	343,19	5,85	14	14,5	0,5

3.A.I.	5,5	5	0,5	333,33	341,61	8,28	13	13,5	0,5
4.B.C.A.	5	3	2	329,54	348,06	19,52	15	15,5	0,5
5.B.G.	7	5	2	280	312,5	32,5	25,5	26	0,5
6.C.D.I.	4,9	2,8	2,1	277,45	291,42	13,97	25,5	15,5	10
7.D.C.	4	3	1	352,02	383,72	31,7	10,5	10	0,5
8.D.A.	4,1	3	1,1	259,03	281,43	22,4	14	13,5	0,5
9.G.A.	8,1	8	0,1	493,97	532,54	38,57	15	12,5	2,5
10.F.M.	2,9	1,4	1,5	388,23	381,50	6,73	12	12,5	0,5
11.G.L.	4,4	3,2	1,2	245,61	245,71	0,10	11,5	11,5	0
12.I.A.	2,3	0,8	1,5	290,69	312.5	21,81	12	11	1
13.I.B.F.	3,1	2,8	0,3	262,65	260,86	1,79	21	20,5	0,5
14.K.F.	6,2	6	0,2	266,27	270,58	4,31	12	12	0
15.M.V.	6,2	5,6	0,6	315,47	331,39	15,92	8	13	5
16.M.P.	6,2	6	0,2	343,19	358,38	15,19	11,5	11,5	0
17.P.R.	4,5	2	2,5	335,19	361,11	25,92	8,5	9	0,5
18.P.S.L.	3,9	1,6	2,3	316,66	324,17	7,51	8	8	0
19.P.D.	4,1	3	1,1	323,52	335,26	11,74	13	12,5	0,5
20.P.M.	8,6	5	3,6	299,40	303,57	4,17	23,5	24	0,5
21.R.D.	6,6	4,2	2,4	296,96	321,42	24,46	16	15,5	0,5
22.R.A.D.	4,5	2,2	2,3	353,59	356,75	3,16	7,5	6,5	1
23.R.F.	5,1	4,8	0,3	373,62	401,06	27,44	2,5	0,5	2
24.R.Ş.	5,5	5	0,5	273,88	280,25	6,37	22	22	0
25.Ş.R.D.	6,8	4,5	2,3	303,88	327,77	23,89	16,5	17	0,5

Table 2. Centralizing table with physiological parameters (I- initial,F-final,D-the difference) - Experiment group: boys

Morphological indicator	**Ruffier test**			**The Bouchard corpulence index (grams)**			**Adrian Ionescu proportionality index (cm)**		
Name and surname	**I**	**F**	**D**	**I**	**F**	**D**	**I**	**F**	**D**
1.A.C.I.	10	8	2	321,21	329,34	8,13	15,5	15,5	0
2.A.E.	9	5	4	337,34	343,19	5,85	14	14,5	0,5
3.B.C.A.	5	3	2	329,54	348,06	19,52	15	15,5	0,5
4.D.C.	4	3	1	352,02	383,72	31,7	10,5	10	0,5
5.D.A.	4,1	3	1,1	259,03	281,43	22,4	14	13,5	0,5
6.I.A.	2,3	0,8	1,5	290,69	312.5	21,81	12	11	1
7.P.R.	4,5	2	2,5	335,19	361,11	25,92	8,5	9	0,5
8.P.S.L.	3.9	1,6	2,3	316,66	324,17	7,51	8	8	0
9.P.D.	4,1	3	1,1	323,52	335,26	11,74	13	12,5	0,5
10.R.A.D.	4,5	2,2	2,3	353,59	356,75	3,16	7,5	6,5	1
11.R.F.	5,1	4,8	0,3	373,62	401,06	27,44		0,5	2

							2,5		
12.R.Ş.	5,5	5	0,5	273,88	280,25	6,37	22	22	0
13.Ş.R.D.	6,8	4,5	2,3	303,28	327,77	23,89	16,5	17	0,5

Table 3. Centralizing table with physiological parameters (I- initial,F-final,D-the difference) - Experiment group: girls

Morphological indicator	**Ruffier test**			**The Bouchard corpulence index (grams)**			**Adrian Ionescu proportionality index (cm)**		
Name and surname	**I**	**F**	**D**	**I**	**F**	**D**	**I**	**F**	**D**
1.A.I.	5,5	5	0,5	333,33	341,61	8,28	13	13,5	0,5
2.B.G.	7	5	2	280	312,5	32,5	25,5	26	0,5
3.C.D.I.	4,9	2,8	2,1	277,45	291,42	13,97	25,5	15,5	10
4.G.A.	8,1	8	0,1	493,97	532,54	38,57	15	12,5	2,5
5.F.M.	2,9	1,4	1,5	388,23	381,50	6,73	12	12,5	0,5
6.G.L.	4,4	3,2	1,2	245,61	245,71	0,10	11,5	11,5	0
7.I.B.F.	3,1	2,8	0,3	262,65	260,86	1,79	21	20,5	0,5
8.K.F.	6,2	6	6,2	266,27	270,58	4,31	12	12	0
9.M.V.	6,2	5,6	0,6	315,47	331,39	15,92	8	13	5
10.M.P.	6,2	6	0,2	343,19	358,58	15,19	11,5	11,5	0
11.P.M.	8,6	5	3,6	299,40	303,57	4,17	23,5	24	0,5
12.R.D.	6,6	4,2	2,4	296,96	321,42	24,46	16	15,5	0,5

Table 4. Centralizing table with physiological parameters (I- initial,F-final,D-the difference) – Control group: class

Morphological indicator	**Ruffier test**			**The Bouchard corpulence index (grams)**			**Adrian Ionescu proportionality index (cm)**		
Name and surname	**I**	**F**	**D**	**I**	**F**	**D**	**I**	**F**	**D**
1.A.C.	4,7	4,6	0,1	338,98	344,63	5,65	9,5	9,5	0
2.A.A.M.	8,9	8,7	0,2	309,08	301,20	7,88	14,5	15	0,5

3.B.M.	7,7	7,7	0	295,85	292,39	3,46	11,5	12,5	1
4.B.C.	5,9	5,6	0,3	283,13	295,18	12,03	15	15	1
5.B.I.C.	9,8	9,6	0,2	307,69	308,13	0,44	11,5	12	0,5
6.B.L.	8,5	8	0,5	293,75	304,34	10,59	17	17,5	0,5
7.C.V.	4,1	4	0,1	293,41	305,38	11,97	14,5	14,5	0
8.C.D.	7,0	7,5	0,5	287,42	297,61	10,19	15,5	16	0,5
9.C.D.P.	11,4	11,5	0,1	401,09	400	1,09	6	6,5	0,5
10.C.I.	5,5	5,3	0,2	288,23	298,24	10,01	12	12,5	0,5
11.C.R.	10,2	10	0,2	291,66	282,35	9,31	12	13	1
12.G.C.	7,1	7	0,1	321,63	323,69	2,06	11,5	11,5	0
13.G.E.	3,6	3,3	0,3	325,58	333,33	7,75	12	12	0
14.H.R.	1,8	2	0,2	339,08	338,98	0,1	11	11,5	0,5
15.I.M.	4,8	5,6	0,8	268,75	273,29	4,54	18	18,5	0,5
16.J.A.	8,0	8,3	0,3	327,38	325,44	1,94	14	14,5	0,5
17.M.D.	7,5	7,5	0	313,60	309,94	3,66	12,5	13,5	1
18.N.A.	4,8	5	0,2	267,44	275,86	8,42	11	11	0
19.N.C.	5,8	5,6	0,2	312,16	315,78	3,62	0,5	1	0,5
20.N.S.C.	9,0	8,8	0,2	265,82	278,48	12,66	18	18	0
21.O.A.	4,5	4,4	0,1	357,14	363,09	5,95	14	14	1
22.R.I.	7,3	7,2	0,1	333,33	343,19	9,86	13	13,5	0,5
23.R.M.	7,0	6,8	0,2	289,01	295,45	6,44	10,5	10	0,5
24.T.D.	7,3	7,4	0,1	348,57	352,27	3,7	10,5	11	0,5
25.T.M.Ş.	8,7	8,6	0,1	364,70	372,09	7,39	11	12	1

Table 5. Centralizing table with physiological parameters (I- initial,F-final,D-the difference) – Control group: boys

Morphological indicator	**Ruffier test**			**The Bouchard corpulence index (grams)**			**Adrian Ionescu proportionality index (cm)**		
Name and surname	**I**	**F**	**D**	**I**	**F**	**D**	**I**	**F**	**D**
1.A.C.	4,7	4,6	0,1	338,98	344,63	5,65	9,5	9,5	0
2.C.V.	4,1	4	0,1	293,41	305,38	11,97	14,5	14,5	0
3.C.D.P.	11,4	11,5	0,1	401,09	400	1,09	6	6,5	0,5
4.C.I.	5,5	5,3	0,2	288,23	298,24	10,01	12	12,5	0,5
5.G.C.	7,1	7	0,1	321,63	323,69	2,06	11,5	11,5	0
6.G.E.	3,6	3,3	0,3	325,58	333,33	7,75	12	12	0
7.H.R.	1,8	2	0,2	339,08	338,98	0,1	11	11,5	0,5
8.J.A.	8,0	8,3	0,3	327,38	325,44	1,94	14	14,5	0,5
9.N.C.	5,8	5,6	0,2	312,16	315,78	3,62	0,5	1	0,5
10.O.A.	4,5	4,4	0,1	357,14	363,09	5,95	14	14	0
11.R.I.	7,3	7,2	0,1	333,33	343,19	9,86	13	13,5	0,5
12.R.M.	7,0	6,8	0,2	289,01	295,45	6,44	10,5	11	0,5
13.T.D.	7,3	7,4	0,1	364,70	372,09	7,39	11	12	1

Table 6. Centralizing table with physiological parameters (I- initial,F-final,D-the difference) – Control group: girls

Morphological indicator	Ruffier test			The Bouchard corpulence index (grams)			Adrian Ionescu proportionality index (cm)		
Name and surname	I	F	D	I	F	D	I	F	D
1.A.A.M.	8,9	8,7	0,2	309,09	301,20	7,88	14,5	15	0,5
2.B.M.	7,7	7,7	0	295,85	292,39	3,46	11,5	12,5	1
3.B.C.	5,9	5,6	0,3	283,13	295,18	12,03	15	15	0
4.B.I.C.	9,8	9,6	0,2	307,69	308,13	0,44	11,5	12	0,5
5.B.L.	8,5	8	0,5	293,75	304,34	10,59	17	17,5	0,5
6.C.D.	7,0	7,5	0,5	287,42	297,61	10,19	15,5	16	0,5
7.C.R.	10,2	10	0,2	291,66	282,35	9,31	12	13	1
8.I.M.	4,8	5,6	0,8	268,75	273,29	4,54	18	18,5	0,5
9.M.D.	7,5	7,5	0	313,60	309,94	3,66	12,5	13,5	1
10.N.A.	4,8	5	0,2	267,44	275,86	8,42	11	11	0
11.N.S.C.	9,0	8,8	0,2	265,82	278,48	12,66	18	18	0
12.T.M.Ş.	8,7	8,6	0,1	364,70	372,09	7,39	11	12	1

Discussions

I processed, evaluated and interpreted the physiological parameters using as indicators reference factors: Ruffier test, Bouchard-Quetelet corpulence index, Adrian-Ionescu proportionality index, parameters we reported to the average of each indicator, calculated both for the experimental group and for control group.

Table 7. Centralizing table with central tendency indices of physiological parameter tests (I- initial,F-final,D-the difference) - Group: class

Morphological indicator		Ruffier test			The Bouchard corpulence index (grams)			Adrian Ionescu proportionality index (cm)		
Parameter		I	F	D	I	F	D	I	F	D
$\underline{\underline{...}}$	*Experiment group*	5,54	4,03	1,51	318,90	333,44	14,54	14,14	13,74	0,40
$\bar{X}$	*Control group*	6,83	6,80	0,03	312,97	317,21	4,24	12,26	12,64	0,38
	Experiment group	7,70	7,20	0,50	248,36	286,83	38,47	17	21,50	4,50
W	*Control group*	9,60	9,50	0,10	135,27	126,71	8,56	17,50	17,50	0
	Experiment group	1,54	1,57	0,03	36,64	38,02	1,38	4,32	3,88	0,44
	Control group	1,83	1,80	0,03	26,26	25,96	0,30	2,49	2,50	0,01
A_m										
	Experiment group	2,02	1,89	0,13	51,77	56,87	5,10	5,76	5,46	0,30
S	*Control group*	2,27	2,24	0,03	33,16	32,17	0,99	3,65	3,63	0.02

Table 8. Centralizing table with central tendency indices of physiological parameter tests (I- initial,F-final,D-the difference) - Group: boys

	Morphological indicator	Ruffier test			The Bouchard corpulence index (grams)			Adrian Ionescu proportionality index (cm)		
	Parameter	**I**	**F**	**D**	**I**	**F**	**D**	**I**	**F**	**D**
...	*Experiment*	5,29	3,53	1,76	320,78	337,27		12,23	11,96	0,27
X	*group*						16,49			
	Control group	6	5,95	0,05	328,89	333,80	4,91	10,69	10,92	0,23
	Experiment	7,7	7,2	0,50	114,59	120,81	6,22	19,05	21,05	2
W	*group*									
	Control group	9,6	9,5	0,10	112,16	104,55	7,61	14	13,50	0,50
	Experiment group	1,60	1,48	0,12	24,58	26,18	1,60	3,75	4,26	0,51
A_m	*Control group*	1,74	1,91	0,17	22,28	21,43	0,85	2,53	2,56	0,03
	Experiment	2,22	1,89	0,33	3,64	34,92	31,28	4,92	5,58	0,66
S	*group*									
	Control group	2,35	2,96	0,61	30,91	28,65	2,26	3,79	3,72	0,07

Table 9. Centralizing table with central tendency indices of physiological parameter tests (I- initial,F-final,D-the difference) - Group: girls

Morphological indicator		Ruffier test			The Bouchard corpulence index (grams)			Adrian Ionescu proportionality index		
	Parameter	**I**	**F**	**D**	**I**	**F**	**D**	**I**	**F**	**D**
...	*Experiment group*	5,80	4,58	1,22	316,87	330,95	14,08	16,20	15,66	0,
X	*Control group*	7,73	7,71	0,03	295,74	299,23	3,49	13,95	14,50	0,
	Experiment group	5,70	6,60	0,90	248,36	286,83	38,47	17,95	14,50	3,
W	*Control group*	5,40	4,60	0,80	98,88	98,80	0,08	7	7,50	0,
	Experiment group	1,37	1,32	0,05	48,53	48,43	0,10	5,10	3,91	1,
A_m	*Control group*	1,45	1,23	0,22	18,70	16,58	2,12	2,37	2,16	0,
	Experiment group	1,76	1,80	0,04	68,50	73,99	5,49	6,08	5,04	1,
S	*Control group*	1,80	1,60	0,20	27,08	26,17	0,91	2,71	2,55	0,

Conclusions

Comparing the progress achieved in the 8 months of experimental and classical work, it can be observed that the group subjected to the experimental work, with specific means what to the development of the motor quality, the force achieves the proposed objectives better of experiment and the skills proposed by the school curriculum.

Following the presentation of the statistically-mathematically processed data and compared between the two ways of achieving them, on experimental and control groups, I believe that the students' interest in the topic aimed at the development of motor quality, strength, frequency and the results of the evaluated instruments (tests) have increased significantly in the experimental group compared to the control group, where the progress was less. Under these conditions, I can state that the main conclusion reaches the objectives proposed in the paper and the confirmation of the formulated hypothesis.

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