

EFFICIENCY OF EXPERIMENTAL FITNESS PROGRAMME FOR YOUNG FEMALE VOLLEYBALL PLAYERS

Original scientific paper

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Abstract

Contingent of the investigation are 24 female volleyball players from the teams of the University of National and World Economy and Locomotive sport club, Sofia. For realization of the target set, and the tasks of the investigation, the following methods have been applied: Sport-pedagogical testing Sport-pedagogical experiment. Training programme (fitness) has been developed for development of speed - force qualities of 17-19 years old female volleyball players. Under the influence of the specialized training work with the means, offered in the developed by us fitness programme, during the period of the investigation, significant positive changes have occurred in the level of development of almost all observed signs of speed-force preparation, with the female volleyball players from the experimental group.

Keywords: *physical preparation, speed-force qualities, physical qualities, training and competitive activity, Sport-pedagogical testing, t-criterion of Student, female volleyball players*

INTRODUCTION

Structure of physical preparation of volleyball players consists of various physical qualities. These qualities are as follows: force, speed, endurance, dexterity, flexibility. The experience of the best trainers in the world and the many-years results from scientific surveys allow making the specification that any of the physical qualities, listed above, has its own complex structure (Fomin, Silaeva, Bolikina, & Belova (Фомин, Силаева, Булькина, & Белова), 2014). We are not saying force only, but force qualities (maximum force, explosive force and force endurance), speed qualities (reaction speed, start speed, speed of movement-turning ability) (Aladjov (Аладжо, 1990; Garipov, Kleshchev, & Fomin (Гарипов, Клещев, & Фомин), 1991; Fomin, et al., 2014).

The process of force/strength preparation in contemporary volleyball is directed towards the development of various force qualities, increasing of the muscle mass activity, strengthening of the connective and bone tissue, improvement of the figure.(Fomin, et al., 2014); Fomin, Topishev, Smirnov & Nantov (Топышев, Смирнов, Хантов), 1984; Fomin (Фомин), 1986, 2012).

Parallel to the development of force, preconditions for increasing of the level of speed qualities, friskiness, flexibility, coordination abilities of the player are created. Important side of the force preparation is the increasing of the capabilities of volleyball player, for realization of the force qualities during the training and competitive activity, and also the optimum interrelation of force with the technique of the game (Arsova (Арсова), 2014; Buy Cham (Буй Чам), 1983; Dasheva (Дашева), 2002; Dimitrova (Димитрова), 1985; Zhechev (Жечев), 1981; Fomin (Фомин), 1981).

Under the influence of the applied specialized methods, the achievements in third groups are influenced positively, with significant difference, connected with the speed-force qualities for upper limbs, lower limbs, as well as the specific manifestations of qualities with the volleyball players. (Bozhkova & Christova, 2006)

According to the eminent expert on conditional preparation Y. Karabiberov, going deep into the essence of work of muscles, engaged in specific movements reveals that it has its own specifics and forms a certain (muscle) spectrum, in which the quality force/strength is a basic element, mutually potentiating on manifestation with the speed, endurance and dexterity. This means that the physical (motive) qualities should not be considered as separate, functionally

isolated parameters of the physical preparation system, but as mutually potentiating ones in a functional entity, subject to conditioning (Karabiberov, (Карабиберов), 2016) .

Development of contemporary volleyball, high level of achievements and investigations of the play efficiency of the best volleyball players in the world (Bozhkova, 2013) requires continuous perfection of the motive qualities, sport technique and all factors connected with the sport results (Arsova (Арсова), 2014; Garipov, et al., 1991).

Achievement of high sport results, to a great extent is determined by the perfection of the methods of physical preparation.

In the recent years, we observe a trend of significant differences in the physical development between the teams with female volleyball players of the age 17-19 years. Teams ranked the award places in the state championships of this age outline with good level of development of physical qualities, and those ranked the places outside the first four, apparently drop behind in that respect.

Purpose of this investigation is to check the efficiency of experimental fitness programme for improvement of the level of speed-force preparation of young female volleyball players of the age 17-19 years.

METHODS

Object of the investigation is the speed-force preparation of 17-19 years old female volleyball players.

Contingent of the investigation are 24 female volleyball players from the teams of the University of National and World Economy and Locomotive sport club, Sofia.

For realization of the target set, and the tasks of the investigation, the following methods have been applied:

- Sport-pedagogical testing
- Sport-pedagogical experiment. Training programme (fitness) has been developed for development of speed-force qualities of 17-19 years old female volleyball players.

Characteristic of the experimental programme in fitness is the fact that the training influences foreseen in it are realized mainly by the means of fitness, which imposes for training hours to be carried out in a fitness-hall.

The programme is of duration of 4 months. Three training hours per week have been carried out (on Monday, Wednesday and Friday), each one of 50 minutes duration, without counting the time for

carrying out the preparatory part of the training.

During the sport-pedagogical experiment, the female contestants from the experimental group are subjected to the influence of the specific training means for development of speed-force qualities, included in the developed experimental training programmes.

In the preparatory period of the experimental (fitness) training programme, the work is directed towards defining the parameters of the training loading. Characteristic for this period is that the pyramidal method is used - 12, 10, 8 repetitions. Series are carried out until refusal. The repeated maximum is defined. We use weights of 70–80 % of the maximum abilities of female contestants. During this period, the correct execution of the exercises is trained. It is a base for the main and competitive period of the preparation. During the main period, the training loading is increased up to 85–90 % of the maximum force (strength) abilities of female contestants. Repetitions in the series are decreased to 4-5, i.e. sub-maximum load. After entering the competitive period, the training programme foresees changes in the work weights, falling to 30-50 % of the maximum ones. In the weekly cycle, one heavy training of 4-5 repetitions remains. These

are mainly exercises for shoulders, chest, back and legs. In the week before competitions, trainings for speed-force work are only 1-2, and at the execution of exercises we search for dynamics.

Toward proving the efficiency of the applied fitness-programme, a comparative analysis of the results of participants in the experimental groups (experimental and controlling) has been carried out. For the purpose, the comparative t-criterion of Student (for independent samples) has been applied.

RESULTS

The presented on Table 1. and Table 2. results, bear information of the average level and variation of the investigated signs of speed-force preparation with both groups at the start up of the fitness-programme.

The comparative analysis (Table 4.) shows that in the beginning of the first experiment, aiming the efficiency checking of the so called fitness-programme on 9 of the indices, the lead is in favor of the control group and only on 3 of the indices, the female contestants from the experimental group, have higher achievements than those

Table 1. Average values and variation of signs of speed-force preparation in the beginning of the fitness-programme – experimental group

№	Indices / Parameters	X	S	V	Min	Max
1.	Dynamometry – strong hand	32,86	4,05	12,33	26,8	38
2.	Dynamometry – weak hand	30,36	4,19	13,79	25	37,3
3.	Solid ball catch – strong hand	4,87	0,36	7,40	4	5,4
4.	Solid ball catch – weak hand	4,46	0,35	7,77	3,8	5
5.	Solid ball catch – two hands	7,74	0,84	10,82	6	8,7
6.	Volleyball ball – striking hand	8,17	0,73	8,95	7	9,4
7.	Abdominal presses	24,86	3,30	13,28	20	32
8.	Standing position vertical jump	38,86	4,20	10,82	32	45
9.	Vertical jump after gaining strength	42,29	4,25	10,05	34	49
10.	Standing position long jump	1,90	0,14	7,18	1,6	2,14
11.	Long jump (triple)	5,55	0,38	6,85	4,9	6,1
12.	Squatting to give up	73,14	12,80	17,50	50	90

Table 2. Average values and variation of signs of speed-force preparation in the beginning of the fitness-programme – control group

№	Indices / Parameters	X	S	V	Min	Max
1.	Dynamometry – strong hand	34,82	4,49	12,89	31	46,2
2.	Dynamometry – weak hand	31,70	4,27	13,46	27,7	43
3.	Solid ball catch – strong hand	4,94	0,66	13,26	3,8	6
4.	Solid ball catch – weak hand	4,49	0,75	16,75	3,7	5,9
5.	Solid ball catch – two hands	8,23	1,00	12,12	6,5	10
6.	Volleyball ball – striking hand	8,83	0,77	8,71	7,8	10,5
7.	Abdominal presses	26,80	2,62	9,76	22	32
8.	Standing position vertical jump	36,10	5,72	15,86	28	45
9.	Vertical jump after gaining strength	39,30	5,36	13,63	31	47
10.	Standing position long jump	1,98	0,17	8,85	1,7	2,2
11.	Long jump (triple)	6,08	0,26	4,29	5,55	6,5
12.	Squatting to give up	49,40	8,88	17,98	35	65

Table 3. Average values and variation of signs of speed-force preparation in the end of the fitness-programme – experimental group

№	Indices / Parameters	X	S	V	Min	Max
1.	Dynamometry – strong hand	35,07	4,05	11,54	29	41
2.	Dynamometry – weak hand	32,50	3,86	11,87	28	39
3.	Solid ball catch – strong hand	5,76	0,40	7,02	4,8	6,2
4.	Solid ball catch – weak hand	5,24	0,42	7,99	4,3	6
5.	Solid ball catch – two hands	8,99	1,16	12,95	6,8	12
6.	Volleyball ball – striking hand	9,62	1,17	12,18	8,1	13
7.	Abdominal presses	32,00	4,26	13,31	28	40
8.	Standing position vertical jump	46,86	4,13	8,81	38	53
9.	Vertical jump after gaining strength	50,79	4,68	9,21	41	58
10.	Standing position long jump	2,02	0,13	6,40	1,75	2,22
11.	Long jump (triple)	5,99	0,30	5,04	5,2	6,4
12.	Squatting to give up	91,07	13,40	14,72	75	120

of the control group. For verification of reliability of the observed differences, the t-criterion of Student (at independent samples) has been applied.

Table 4. Significance of differences between the average levels of signs of speed-force preparation of the participants in the experiment – beginning

t - criterion		
Indices / Parameters	Control group	End
1. Dynamometry-strong hand	- 1,12	
2. Dynamometry- weak hand	-0,76	
3. Solid ball catch-strong hand	0,34	
4. Solid ball catch-weak hand	-0,13	
5. Solid ball catch-two hand	-1,29	
6. Volleyball ball-striking hand	-2,20	
7. Abdominal presses	-1,54	
8. Standing position vertical jump		1,36
9. Vertical jump after gaining strength		1,52
10. Standing position long jump	-1,26	
11. Long jump (triple)	-3,79	
12. Squatting to give up		5,05

Table 5. Comparative analysis of speed-force preparation of the experimental group – fitness programme

Indices / Parameters	Average level	
	Beggining	End
1.Dynamometry – strong hand	32,86	35,07
2.Dynamometry – weak hand	30,36	32,50
3.Solid ball catch – strong hand	4,87	5,76
4.Solid ball catch – weak hand	4,46	5,24
5.Solid ball catch – two hands	7,74	8,99
6.Volleyball ball – striking hand	8,17	9,62
7.Abdominal presses	24,86	32,00
8.Standing position vertical jump	38,86	46,86
9.Vertical jump after gaining strength	42,29	50,79
10.Standing position long jump	1,90	2,02
11.Long jump (triple)	5,55	5,99
12.Squatting to give up	73,14	91,07

Fig. 3 Table6. Significance of differences between the average levels of the signs of speed-force preparation of female volleyball players from the experimental group, reported during the fitness-programm

t - criterion	
Indices / Parameters	End
1.Dynamometry – strong hand	1,45
2.Dynamometry – weak hand	1,41
3.Solid ball catch – strong hand	5,92
4.Solid ball catch – weak hand	5,19
5.Solid ball catch – two hands	3,28
6.Volleyball ball – striking hand	3,92
7.Abdominal presses	4,96
8.Standing position vertical jump	5,06
9.Vertical jump after gaining strength	5,03
10.Standing position long jump	2,37
11.Long jump (triple)	3,37
12.Squatting to give up	3,62

From the Table 4, it is also seen that on 3 of the indices, the values of the comparative t-criterion are higher than the critical (tr. = 2,07), which gives reason with high guarantee probability to assert that in the beginning of fitness programme, the experimental group has significantly lagged behind the control one, as regards the level

of development of:

- explosive force of lower limbs with multiple muscle efforts on horizontal plain (index 11, t11 = 3,79), and
- explosive force of shooting hand with negligible resistances (index 6, t6 = 2,20).

At the same time, the contestants from the experimental group have significantly better developed speed-force endurance of lower limbs (index 12, t12 = 5,05).

The fact that significant priorities in the beginning of the application of the experimental fitness-programme are only three and two of them are in favor of the control group, gives a good reason to deem that as a whole, there are not significant differences between the average levels of the observed signs with the investigated groups, which is a mark of correctness at the start of the experiment.

As for the homogeneity of both groups, index of which are the values of the coefficient of variation V, from Table 1. and Table 2. it is seen that in the beginning of the period of observation, they have been homogeneous and relatively homogeneous regarding the investigated signs of the speed-force preparation.

Under the influence of the specialized training work by the means offered in the developed by us fitness-programme, during the period of investigation there occur a positive changes in the level of development of all observed signs of speed-force preparation, with female volleyball players from the experimental group. This, quite naturally reflects on the average levels and variation of these signs, in the end of the first experiment (Table 3.).

Thus for example, the analysis of the results shows that for the time of the experiment, the number of squats carried out averagely for the group, has increased from 73,14 to 91,07, the number of abdominal presses /exercises (Index 7.) - from 24,86 to 32,00, and the average achievements at the vertical jumps (indexes 8 and 9) – by about 8 cm Table 5).

At the same time however, we observe indices on which the change is almost imperceptible which supposes inefficiency of the influence of training during the first experiment. In order to check the significance of the observed differences between the average levels of all investigated signs, the procedure for check up of hypotheses by means of t-criterion of Stuart for independent samples has been applied (Table 6.).The results presented on the figure show that on 10 of the investigated signs, there is ground of high guarantee (Pt ≥ 95 %), for the null hypothesis to be rejected and the alternative one accepted as true, according to which as a result of the applied training influences by the means of fitness, with female volleyball players from the experimental group, there have occurred significant positive changes, as regards the following:

- explosive force both of the strong and the weak upper limb at overcoming higher indices (3 and 4) or lower resistances (index 6);
- explosive force of lower limbs at muscle efforts on vertical plain (indices 8 and 9);
- explosive force of abdominal muscles (index 7);
- speed-force endurance of lower limbs (index 12);
- explosive force of lower limbs at muscle efforts on horizontal plain (indices 8 and 9);
- explosive force of upper limbs and shoulder girdle at synchronic efforts forward and upward (index 5).

On these indices, the values of t-criterion are higher than the critical value, here being 2,06.

From Tble6,. it is also seen that with 2 of the indices, the values of t are lower than 2,06 and consequently, of good reason the null hypothesis regarding the signs these indices bear information of, could be confirmed. It means that the changes regarding the lock

strength, occurred under the influence of the applied methods, both of the strong (suitable), and weak (unsuitable) upper limb, are negligible and could be explained by casual reasons.

CONCLUSIONS

Under the influence of the specialized training work, by the means offered in the developed by us fitness-programme, during the period of the investigation, there occur significant positive changes in the level of development of almost all observed signs of the speed-force preparation of female volleyball players, from the experimental group. Exceptions are observed only as regards the lock strength.

In order to be applied successfully in practice, the developed experimental fitness-programme should be corrected increasing within the volume of training means for development of the signs on which the occurred changes are negligible.

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