

SPECIFIC FEATURES OF ELITE BODYBUILDERS' TRAINING PROCESS IN COMPETITION PERIOD

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Abstract. *Purpose:* To substantiate methodic of training process construction for elite bodybuilders in competition period with usage of different training methods. *Material:* elite bodybuilders – members of combined team of Ukraine (n=16) participated in the research. *Results:* we presented comparative characteristic of the most often used bodybuilding training methodic. Besides, optimal training methodic in competition period was worked out and substantiated. Such methodic permits to improve body proportions at the account of fat layer reduction. By the data of Harvard step-test the sportsmen improved organism's functional potentials by 6%. *Conclusions:* the offered methodic noticeably reduces probability of functional unfavorable states (over-training, overloading, traumas). The methodic permits to achieve the required sport form without over-tension adaptation-compensatory mechanisms and acquire maximal muscular relief; improve proportions with minimal losses of muscles' volume.

Key words: training, bodybuilders, proportions, competition period, training methodic.

Introduction

Bodybuilding – is a kind of sports, in which sportsmen try to develop their constitution in the most harmonious way. Competition criteria of bodybuilding are mass of muscles, muscle separation (expressed separation of one muscles' group from other) and muscle definition (muscular relief and internal muscular specifying); proportional condition of muscular groups [9, 10]. In competition training period sportsmen try to reduce percentage of fat and improve proportions [6]. Specificities of training construction in bodybuilding were copied from more studied and developed kinds of sports (weight- and power-lifting) [13, 14].

Analysis of domestic and foreign literature showed that many works were devoted to construction of training process in competition period [8, 15]. A.V. Samsonova [1] showed that bodybuilders require special approach to training process. Bodybuilding training differs from other power kinds of sports, in which condition of muscular fibers is only result of power training. It is known that the highest potential for growing is intrinsic to II-B type fibers. It was found that interval mode of training was the most optimal: range of repetitions– 8-12; load level - 70-80% from single maximum [2, 5]. V.M. Platonov [3, 4] showed demand in micro and macro-periodizing in different kinds of sports. Introduction of different by load micro-cycles facilitates increase of muscular volume and reduce sub cutis. The recommended duration of competition period is 8-12 weeks. The problems of periodizing in bodybuilding were dealt with by V. Usychenko [6]. The author analyzed the existing variants of macro-periodizing and showed advantages and disadvantages of one-cycle, two-cycle and three-cycle planning systems in bodybuilding.

Ben and Joe Weider worked out system of elite bodybuilders' training, which was characterized by high volume of training sessions. They widely used such methodic techniques of intensity increase as supersets, drop-sets, giant sets. The recommended mode of work (6 training during week micro-cycle) was oriented on development of anaerobic capacity [9, 10]. V.Yu. Jim showed disadvantages of this system. They included increasing risk of sportsmen's over-fatigue. The author offered system, envisaging individualization of training process during annual macro-cycle [6, 7, and 21]. In particular, for competition period load of 40-70% from maximal is recommended with quantity of training days 6 and quantity of one exercise repetitions - 20-25.

Correlation of anaerobic, aerobic works, as well as special load (for compulsory competition program for elite bodybuilders in competition training period) has not been still studied yet.

Hypothesis: it was assumed that the worked out methodic for elite bodybuilders in competition training period can be effective, if to use one-cycle annual macro-cycle and optimally select micro-cycles. Such approach will facilitate improvement bodybuilders' sport perfection.

Purpose: to work out and substantiate methodic of training process construction for elite bodybuilders in competition period.

Material and methods

Participants: elite bodybuilders – members of combined team of Ukraine (n=16) participated in the research. Their age was 25-33 years. Their body mass values were 85 ± 2 – 105 ± 2 kg. The participants were divided into two groups: control (n=8) and experimental (n=8).

Organization of the research:

The research was conducted on the base of Kharkov state academy of physical culture (weight-lifting and boxing department) in different gyms (“Pheromone”, “Tetra”, “Black Bison”, “Forma”, CJSS № 9*, «Misto”, “Metallist” in Kharkov), SC** “Dynamo” (Komsomolsk), club “Sensei” (Kiev) and SC “Neftechimik” (Kremenchug).

On the base of weight-lifting and boxing department of Kharkov state academy of physical culture and sport circles of Kharkov and Poltava regional bodybuilding federations we conducted pedagogic experiment.

*CJSS – children- junior sport school (*note of translator*)

** SC – sport club (*note of translator*)

Participants of experiment trained 6 times a week. In experimental group training the worked out by us methodic of competition period construction (see table 1) was introduced. Control group trainings were conducted by traditional scheme (see table 2), used in sport clubs. In both groups, at the beginning and at the end of training competition period we controlled anthropometric data and power indicators, which did not confidently differ at the beginning of experiment ($P > 0.05$).

Statistical analysis was fulfilled with the help of Statistika 10.0 programs. Student’s t-criterion was used for checking of differences’ confidence between samples’ indicators and was considered to be statistically significant at $p < 0.05$.

Results of the researches

In training process of elite bodybuilders we used one-cycle planning system in annual macro-cycle (see table 1).

Table 1. Scheme of one-cycle planning in annual training of bodybuilders

Period	Stage	Meso-cycle	Months
Preparatory	General-preparatory	Involving	XII
		Basic	I
		Basic	II
		Basic	III
		Basic	IV
	Special-preparatory	Control-preparatory	V
		Control-preparatory	VI
		Pre-competition	VII
		Competition (selective competitions)	VIII
		Competition	IX
Competition	Competition	Control-preparatory	X
		Competition (main competitions)	XI
Transitive	Recreational	Recreational	XI

Effectiveness of training was assessed by dynamic of power and endurance indicators; by dynamic of anthropometric changes and organism’s functional state.

Control group sportsmen had three meso-cycles in competition period. Each meso-cycle consisted of four week micro-cycles. Control-preparatory stage consisted of three advanced and one recreational micro-cycle. Pre-competition meso-cycle consisted of one involving and three advanced micro-cycles. Competition period included one involving, two advanced and one competition micro-cycles (see table 2).

Table 2. Scheme of CG training in competition period

Stage	Meso-cycle	Micro-cycle
Competition	Control-preparatory	Adv., adv., adv., rec.
	Pre-competition	Inv., adv., adv., adv.
	Competition	Inv., adv., adv., comp.

Notes: Adv. – advanced; Rec. – recreational; Inv. – involving; Comp. – competition.

Experimental group sportsmen had two competition meso-cycles (I and III). The second meso-cycle was control-preparatory. Every meso-cycle consisted of four micro-cycles. The first competition meso-cycle consisted of involving, advanced, preparatory and competition micro-cycles. The first competition meso-cycle was completed by selective competitions. Control-preparatory meso-cycle included involving, two preparatory and competition micro-cycles. It is completed by main competitions of the year (see table 3).

Table 3. Scheme of EG training in competition period

Stage	Meso-cycle	Micro-cycle
Competition	Competition (selective competitions)	Inv., adv., prep., comp.
	Control-preparatory	Recr., inv.,adv., adv.
	Competition (main competitions)	Recr., prep.,prep., comp.

Notes: Inv. – involving; adv. – advanced; prep. – preparatory; recr. - recreational.

In competition stage the main task is acquiring maximal relief of muscles by sportsmen, fat layer reduction; proportions' improvement and preservation of muscles' mass [17, 18, 20].

In EG training process was built in the following way: during advanced micro-cycles sportsmen trained in zone of sub-maximal relative power. The work in such zone lasts up to 5 minutes [1, 19, and 22].

Sportsmen trained twice a day during six days. One day was day off. One training was conducted in simulators gym in zone of moderate and great relative power with usage Joe Weider's principles [9, 16]: supersets. Tri- sets, Giant sets, drop sets. Training session took 50 minutes – 1 hour. The training was directed on development of II-A type muscles that permitted to achieve maximal relief of muscles with minimal losses of muscles' volume.

Other training in the same day in first meso-cycle had aerobic orientation. Trainings of aerobic orientation with little and moderate loads were used for quicker recreation after power trainings. Besides, they developed general endurance and improvement sportsman's functional state. The means of trainings were: run on treadmill swimming in water pool, stationary bicycle. Time of training and degree of load varied depending on the tasks of micro-cycle.

In second meso-cycle quantity of aerobic trainings shortened up to three a week. Trainings of compulsory static positions and positions of free programs were added.

In third meso-cycle of competition stage EG program changed in the following way: part of aerobic trainings was replaced with working at compulsory competition positions. Static training took one hour a day and six times in week micro-cycle. Sportsmen took seven compulsory positions in front of mirror and kept every position one and half minute each. Coach looked after proper tension of all demonstrated muscles. With it face muscles should be relaxed and express positive emotions and self confidence (see table 4).

Table 4. Time of exercises and loads of different character for EG in competition period

Competition period		No of micro-cycle	Type of micro-cycle	Time, minutes			Degree of load		
Meso-cycle	Ae.			An.	Tech.	Ae.	An.	Tech.	
Competition period (selective competitions)	1	Inv.	130	240	165	Av.	Subs.	Low	
	2	Adv.	100	240	185	Low	High	Av.	
	3	Prep.	115	165	245	Av.	Av.	High	

	4	Comp.	0	180	120	Low	Av.	Av.
	5	Recr.	115	175	155	Av.	Av.	Av.
Control preparatory	6	Inv.	100	225	155	Low	High	Av.
	7	Inv.	105	240	145	Low	Bord.	Av.
	8	Adv.	105	240	130	Low	Bord.	Low
	9	Recr.	115	175	175	Av.	Av.	Subs.
Competitions	10	Prep.	90	165	240	Av.	Av.	High
	11	Prep.	90	165	240	Low	Low	High
	12	Comp.	0	180	120	Low	Low	Av.

Notes: Low – low load for recreation; Av. – average load for supporting physical qualities; Subs. – substantial loads for physical qualities’ development; High – high loads for physical qualities development; Bord. – bordering loads for physical qualities development (by Zatsiorsky, 1995 [25]) Ae. – aerobic load; An.- anaerobic load; Tech. – technical training (in bodybuilding work at competition program).

During competition period in every micro-cycle quantity of barbell lifting and quantity of lifted kilograms varied. The data by every micro-cycle and total data of meso-cycle are presented in table 5.

Table 5. Quantity of barbell lifting and load in kg for EG in competition period

Meso-cycle	Micro-cycle	QBL, basic	QBL, shaping	Tonnage, basic, kg	Tonnage, shaping, kg
Competition (selective competitions)	Inv.	691	358	57251	9319
	Adv.	825	423	76519	12457
	Prep.	548	642	42969	18762
	Comp.	441	301	37583	9309
Total		2505	1724	214322	49847
Control preparatory	Recr.	687	331	51891	5659
	Inv.	735	406	61608	11086
	Adv.	791	431	76311	13247
	Adv.	918	502	85954	14807
Total		3131	1670	275764	44799
Competition (main competitions)	Inv.	691	358	57251	9319
	Prep.	517	615	36552	16470
	Prep.	511	603	29542	13434
	Comp.	441	301	37583	9309
Total		2160	1877	160928	48532

Notes: QBL - quantity of barbell lifting; Tonnage – any mass measured in tons.

Table 4 data show that in first competition meso-cycle experimental group sportsmen fulfilled 2505 barbell basic lifts and 1724 – shaping lifts. Tonnage was 214.322 thousand kg in basic exercises and nearly 50 thousand in shaping. Thus, load distribution permitted to perfect relief of muscles with minimal losses of muscles’ volume. The task of this meso-cycle was to select sportsmen for main competitions of season. In control-preparatory meso-cycle load distribution in EG was as follows: in basic exercises QBL was 3131 (by 24% more than in previous meso-cycle); in shaping – 1670 (by 3% less than in previous). In basic exercises sportsmen lifted 275.764 thousand kg (by 28.6% more than in previous meso-cycle) and in shaping – 44.799 thousand kg. (by 10% less, than in previous meso-cycle). Increase of loads in basic exercises and reduction in shaping was conditioned by the tasks of meso-cycle. The purpose of these tasks was improvement of muscles’ separation and definition. It is known that exercises of basic character influence more powerfully on sportsman’s organism.

In third meso-cycle EG sportsmen fulfilled 2160 barbell lifts in basic exercises (by 31% less than in the second meso-cycle and by 13% less than in the first). Tonnage was 160.928 thousand kg. In basic exercises (by 41% less than in the previous and by 24% less, comparing with the first meso-cycle) and 48.532 thousand kg in shaping exercises (that was by 8% more than in second meso-cycle and by 2% less than in the first meso-cycle).

In table 6 we give changes of anthropometric data for control and experimental groups.

Table 6. Mean indicators of anthropometric data reduction in CG and EG elite bodybuilders in competition period (n₁= n₂=8)

Indicators	CG		EG		V, % ^t	p
	$\bar{X}_1 \pm m_1$	V, %	$\bar{X}_2 \pm m_2$	V, %		
Body mass, kg.	17.54 ± 0.82	13.14	8.40 ± 0.10	3.27	21.37	<0.001
Neck circumference, cm.	3.12 ± 0.03	2.76	1.33 ± 0.01	2.25	55.50	<0.001
Chest circumference, cm.	14.84 ± 0.14	2.76	4.03 ± 0.03	2.25	72.92	<0.001
Inhale, cm.	14.84 ± 0.14	2.76	4.09 ± 0.03	2.22	72.51	<0.001
Exhale, cm.	14.84 ± 0.14	2.76	3.94 ± 0.03	2.30	73.52	<0.001
Waist circumference, cm.	6.88 ± 0.10	4.17	12.06 ± 0.16	3.85	26.85	<0.001
Shoulder circumference, cm	4.53 ± 0.08	4.90	1.49 ± 0.03	4.92	36.73	<0.001
Forearm circumference, cm.	4.45 ± 0.04	2.76	1.18 ± 0.01	2.30	73.52	<0.001
Thigh circumference, cm.	8.80 ± 0.09	3.03	2.92 ± 0.04	4.13	56.88	<0.001
Shin circumference, cm.	3.52 ± 0.04	3.03	1.31 ± 0.02	4.13	52.18	<0.001

Notes: t – Student’s t-criterion or determination the confidence of difference; p – level of confidence (difference was considered to be confident at p<0.05).

By the results of our research EG sportsmen lost less amount of body mass. For assessment sportsmen’s functional state we used Harvard step-test. Both groups sportsmen ascended on of platform of 50 cm height during 5 minutes with race 30 ascend and descend per one minute. After fulfillment, during 30 seconds pulse is measured. Pulse also is measured at 2nd, 3rd and 4th minutes of recreation.

$$\text{HST index} = \text{tx}100/(\text{f1}+\text{f2}+\text{f3})\times 2,$$

where f1;f2;f3 – pulse data at 2nd, 3rd and 4th minutes of rest and, t – time of test fulfillment.

Table 7. Harvard step-test results

	t, time in seconds	f1	f2	f3	IIGCT
Control group	300	79.75	74	68	67.6625
Experimental group	300	67	62.5	55.5	81.47

Notes: Indicators of Harvard step-test: <55 – bad physical fitness; 55-64 – below average; 65-79 average; 80-89 – good; >90 – excellent.

By the data of Harvard step-test control group sportsmen had average physical fitness and experimental group sportsmen – good. It witnesses that experimental group sportsmen recreate quicker and have better functional state. This test was conducted also for testing sportsmen’s functional state in preparatory and general preparatory periods [21]. In time of special-preparatory and competition stages both groups’ sportsmen improved their results. In control group IHST improved by 1.79%, and in experimental group – by 6%.

As far as power indicators concern both in control and experimental groups single maximum reduced (see fig.2).

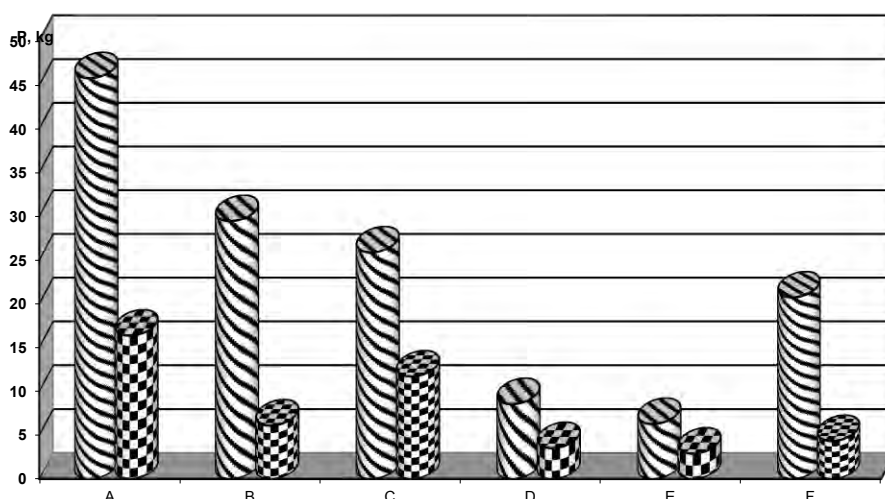




Fig.2. Dynamic of changes in special physical fitness (SPF) in control and experimental groups in competition period: P – Indicators; A – Squatting with barbell; B – Barbell pressing in lying position; C – back strength; D – barbell pressing in standing position; E – arms’ bending in standing position; F – barbell pressing with narrow grasp, in lying position.

 - control group;
 - experimental group.

As per results of our research both groups’ sportsmen lost power in connection with reduction of body mass. Sportsmen, who trained by experimental methodic reduced their indicators less noticeably (see fig. 1).

Discussion

Recent years some researches devoted to content and methodic of elite bodybuilders’ training with different methods of endurance and power qualities have been fulfilled [6, 7, and 11]. Besides, there are works on training process planning in competition period and its influence on bodybuilders’ competition form. However, influence of aerobic and anaerobic power trainings on sportsmen in competition period has not been studied yet.

We note demand in micro-periodization for sportsmen in competition period as well as offered the system of one-cycle training. Such approach coincides with recommendations of V.M. Platonov [3, 4]. We considered demand in selective competitions and proved the data of muscular relief improvement in competition period, providing optimal loads [23, 24]. Besides we expanded the data of V.V. Usychenko on usage of one-cycle annual planning system [8].

In our research we proved significance of usage of Joe Weider’s methods of intensification increasing [9, 16]. For solution of micro-cycle tasks we offered application of such methods with certain dozing for every micro-cycle. Besides, we expanded Ben and Joe Weider’s methodic by replacing some anaerobic exercises with aerobic ones [9, 10]. Such methodic facilitates better recreation of sportsmen. Exercises for aerobic endurance facilitate quicker elimination of sub cutis.

We also confirmed the data about better training regime for muscular fibers’ overgrowth: optimal regime is 3-4 attempts (8-12 repetitions in each) [1, 2].

The obtained results enrich our previous researches on improvement of elite sportsmen organism’s functional state after dozed aerobic loads [11, 12]. We supplemented the data about demand in introduction compulsory positions and free competition program in training program [17, 21]. In the offered by us methodic we mentioned the required quantity of such exercises, depending on micro-cycle. We also expanded the data of domestic [6, 21, 15] and foreign authors [9, 17, 20] about increasing the most important power and endurance indicators.

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Conclusions

Perfection of elite bodybuilders' training process permits to think that the offered for EG program gives more expressed effect. The offered methodic of training process perfection substantially reduces probability of unfavorable functional changes in sportsmen (over-tension, over-training, traumas). It permits to achieve the required sport form without over-tension of adaptation-compensatory mechanisms. Such methodic permits for sportsmen to acquire maximal relief, improve proportions with minimal losses of muscles' volume.

Conflict of interests

The author declares that there is no conflict of interests.

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