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Efficiency of the technique of the training process of highly skilled bodybuilders of the mesomorphic type of constitution in the competitive period

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Purpose: *foundation of efficiency of the technique of the training process of highly skilled bodybuilders in the competitive period.*

Material & Methods: *16 highly skilled bodybuilders of 22–30 years old participated in the research, the average body weight of sportsmen makes 87±2 – 102±2 kg, which are included in the structure of the national team of Ukraine on bodybuilding. Methods: method of the theoretical analysis and generalization of literature, pedagogical observation, pedagogical experiment, method of mathematical statistics.*

Results: *the comparative characteristic of the most often used techniques of the training process in bodybuilding is provided. The effective technique for highly skilled bodybuilders of the mesomorphic type of constitution, depending on the initial uniform of a sportsman at the beginning of the competitive period of training is developed and proved. Dependence of change of body weight of a bodybuilder on the training process is directed.*

Conclusions: *on the effective training method, depending on microcycle of trainings in the competitive period precompetitive and competitive mesocycles (selection and main competitions), is offered the basis of the conducted research.*

Keywords: *structurization of training, bodybuilding, training process, qualified bodybuilder, optimum technique, microcycle.*

Introduction

New kinds of sport for the state began to be in rather great demand at youth and mature sportsmen from the beginning of the 90th years in Ukraine. First of all concerning weightlifting, these are such types as: powerlifting and bodybuilding. Considering that the native theoretical and practical training base on these types is only at the development stage, the subject of this article for native sport is rather urgent.

One of the major problems in training of sportsmen-bodybuilders in Ukraine to competitions is adaptation of foreign classical techniques to native realities and achievement thus of good results.

The system of training of highly skilled sportsmen in bodybuilding is based on the optimum constructed training process in total with food and restoration as the factors, providing necessary conditions for the increase in muscle bulk and the decrease in percent of subcutaneous fat.

Therefore, the technique of training process of highly skilled bodybuilders of the mesomorphic type of constitution in the competitive period of year cycle of preparation was developed [1; 4].

There are very few evidence-based training techniques of training of highly skilled bodybuilders in the competitive period in domestic sport. Thus, coaches and sportsmen should gain the practical experience by trials and mistakes [10; 11].

The competitive period lasts 8–12 weeks in training of highly skilled bodybuilders. During this period highly skilled sportsmen of various categories try to reduce as much as possible quantity of hypodermic fatty layer and hypodermic water through training with optimum burdening, trying to obtain thus definition and separation of muscles. At the end of each microcycle the uniform of a sportsman is estimated by a coach and the anthropometry is measured, amendments are introduced in the training process and the plan of food [6; 7; 16–18].

Such domestic experts in the field of physical culture and sport as V. M. Platonov, L. S. Dvorkin, A. I. Stetsenko, B. I. Sheyko, V. G. Oleshko, O. I. Kamayev, D. A. Beskorovaynyi, V. V. Usichenko [4–10] dealt with this problem. Their research was based on the experience of such foreign experts in area as Joe Weider, Ben Weider, E. Connors, T. Kimber, M. McCormick [2; 3; 8].

Communication of the research with scientific programs, plans, subjects

The scientific research is executed on the subject of the Consolidating plan of the research works in the sphere of physical culture and sport for 2011–2015 3.7 “Methodological and organizational and methodical bases of determination of individual norm of physical condition of the person” (number of the state registration is 0111U000192).

The purpose of the research:

to prove efficiency of the technique of training process of highly skilled bodybuilders of the mesomorphic type of

constitution in the competitive period.

Material and Methods of the research

Members of the national team of Ukraine participated in this research. 16 bodybuilders from whom 4 masters of sports of international class, 12 – MSU, at the age of 22–30 years, the average body weight of sportsmen makes 87±2 – 102±2 of kg were involved in the experiment. Participants were distributed on sports qualification on two groups, control and experimental groups. Participants of the experiment of the control group trained 5 times a week, and participants of the experimental group trained 5–6 times a week.

Research methods: method of the theoretical analysis and generalization of literature, pedagogical observation, pedagogical experiment, methods of mathematical statistics.

Results of the research and their discussion

Two options of the training technique, which differed in loading and volume of training routines, rest and other components, were used in the conducted researches in the training process of highly skilled bodybuilders. The assessment was carried out by means of diaries of training in which the quantity and volumes of training work were specified.

The efficiency of preparation was estimated on anthropometrical indicators, by means of the method of expert evaluations, which provided information on implementation of instructions of a coach, dynamics of power indicators and on endurance, and also subjective qualities (health, mood, desire to train, etc.).

Sportsmen of the control group trained within 12 weeks with big percentage burdening, and sportsmen of the experimental group used average loadings with the emphasis on eccentric loading of muscles (tab. 1, 2). The test weighing of participants of the experiment of both groups, and also anthropometrical measurements was carried out before the experiment. The device the body weight analyzer (scales TANITA BC-545, made in Japan) and centimetric tape (tab. 3, 4) were used for carrying out weighing.

The difference of the competitive period from the preparatory period consists in smoother transition from one training microcycle to another, and also in increase in number of repetitions and attempts for better separation and definition of muscles (tab. 1). We used methods of increase in intensity, such as supersets, drop sets, and also huge sets for the solution of these tasks. The increase in trainings, reduction of gaps between training days plays the large role in preparation at this stage. The exercise performance time, both on positive phases, and on negative phases, and the most important

Table 1

Contents of the training program depending on lot of burdening in the competitive period of highly skilled bodybuilders of the mesomorphic type of constitution of control and experimental groups

Indicators of training load and classification of muscular groups	Mesocycles					
	Competitive		Control- preparatory		Competitive	
	CG	EG	CG	EG	CG	EG
Loading range percentage of maximum.	70–80	55–70	60 – 80	30–60	80–70	70–30
Number of training days	6	6	5	6	6	6
Number of repetitions	12–15	18–20	10–12	12–18	12–15	15–25
Number of attempts	4	4	5–6	5–6	5–6	6-8
Exercise performance time (s)						
Positive phase (movement up)	1	0,5	1	0,5	1	0,5
Negative phase (movement down)	1,2	0,5	1,2	0,5	1	0,5
Pauses between repetitions, s	0,8	–	0,8		0,5	-
Rest between attempts (min)						
In general exercises	1,8	1	2–2,5	1–1,2	1,5	1
In the forming exercises	1	0,6–0,7	1,5	50	1	30–50
Time of rest between loads of muscle groups (days)						
Hips	5	3	5	3	4	3
Back	4	3	5	3–5	4	3–5
Thorax	3	4	3	4	3	4
Deltoid muscle	4	5	4	5	4	5
Biceps	2	3	2	3	2	3
Three-headed muscle	3	4	3	4	3	4
Forearms	2	2	6	5	6	5
Three-headed muscle of shin	4	3	6	3	6	3
Oblique and direct muscles of stomach	2	1	3	1	3	1
Neck	2	1	0	2	0	2

Table 2

The total volume of the training work, which is performed by highly skilled bodybuilders of the mesomorphic type of constitution of control and experimental groups in the competitive period

Group of muscles	Volume, NRB		Volume, thousands kg	
	CG	EC	CG	EC
General exercises on:				
Muscles of belt of upper extremities	715	845	76,96	81,25
Muscles of hands	1014	1170	99,515	111,358
Thorax muscles	756,6	952	114,725	125,32
Back muscles	1273	1,53	215,93	236,717
Muscles of hip and shin	2,036	2,34	312,731	397,404
In total	5,794	6,83	819,861	952,049
Forming exercises on:				
Muscles of belt of upper extremities	2,015	2,12	143,442	181,376
Muscles of hands	1066	1255	75,725	84,994
Thorax muscles	676	819	82,771	84,994
Back muscles	1,346	1,78	136,955	153,504
Muscles of hip and shin	4,779	5,34	656,825	699,062
Stomach muscles direct and slanting	11,51	12	–	–
In total	21,39	23,3	1095,72	1203,93

Note. *NRB – the number of raising of bar.*

also significantly decreased, pauses between repetitions decreased in underwater microcycle up to 0,5 seconds, and there was no rest between repetitions at all in the competitive microcycle. Thus, we created optimum conditions for bodybuilders of high qualification of the mesomorphic type of constitution.

Distinctive characteristics of this period is the small percentage application of small burdening, making in the first competitive mesocycle at the end of which elimination competitions, – CG of-70-80%, loading made 55–70% in EG; in the precompetitive mesocycle – EG – 30–50%, in CG – 60–80%; and in the second competitive mesocycle in EG makes 70–30%, in CG – 80–70%, thus, in EG more attention is paid to study of muscles, but not raising of weight that is the most important at this stage.

It follows from table 2 that bodybuilders of the experimental group trained with average burdening from the maximum loads, the control group trained with small amount of repetitions, but with high intensity that in precompetitive mesocycle is not recommended and threatens with overtraining as sportsmen prepare for competitions and reduce amount of carbohydrates at this stage. So, much attention is paid to muscles of hip and shin in the competitive period – the number of raising of bar (NRB) for three microcycles makes in EG – 2,341 rises, in CG – 2,036 mainly at the expense of muscles of hands, thorax and back which are almost identical (650–732 raising of bar, in 62,500–96,400 kilograms). Despite it, the main role is played by the forming exercises in this period which were different and on NRB, and the counted kilograms therefore the most large number of raising of bar was at the expense of direct and oblique muscles of stomach and made in EG – 9,220 NRB and in CG – 8,850 NRB. Total amount in general exercises of NRB makes: in EG – 6,830 and in CG – 5,790; and in the forming exercises: in EG – 23,300 and in CG – 21,390 NRB. Thus, CG used more power program of preparation and small amount of NRB with big burdening, EG used more static program of preparation and used large number of NRB at the expense of what the volume of kilograms was high. Use of such operating mode allowed sportsmen to be restored and exhaustion of muscle fibers owing to power training was optimum for the subsequent super-compensation.

Total amount in the counted kilograms in general exercises in EG makes 952,049, in CG – 819,862, performing the forming exercises; total amount makes in EG – 1203,930 kilograms, in CG – 1095,720. Thus, sportsmen of the experimental group trained at this stage with the average number of kilograms that was optimum, and paid much attention to muscles of stomach and muscles of legs as after the preparatory period, which proceeded 28 microcycles, the large increase of fatty layer on muscles of stomach and hips was. Sportsmen of CG paid more attention to general exercises and power indicators, than the forming exercises.

Measurements of anthropometrical indicators of bodybuilders were made before the experiment. It follows from tab. 3 that coefficients of variation of all main anthropometrical indicators, separately for control and experimental groups, practically did not exceed the general initial level.

The anthropometrical examination was conducted before the beginning and at the end of the competitive period (tab. 3, 4).

So, the distinctions are not considerable at the beginning of the competitive period of preparation: in body weight (control – 91,63 kg, experimental – 92,00 kg; P>0,05); waist circles (respectively 78,72 sm, 80,31 sm; P>0,05); hip circles (respectively 77,42 sm, 78,12 sm; P>0,05); neck circles (respectively 40,67 sm, 40,93 sm; P>0,05); thorax on breath (respectively 108,45 sm, 115,88 sm; P>0,05) and on exhalation (respectively 103,22 sm, 105,08 sm; P>0,05) and shins (respectively 39,53 sm, 40,29 sm; P>0,05).

Table 3

Average values of anthropometrical data of highly skilled bodybuilders of the mesomorphic type of constitution of control and experimental groups at the beginning of the competitive period (n1=n2=8)

Indicators	CG		EG		t	P
	$\bar{X}_1 \pm m_1$	V, %	$\bar{X}_2 \pm m_2$	V, %		
Body weight, kg	92,25±3,67	10,69	91,63±3,96	12,05	0,02	>0,05
Circle of neck, sm	40,67±1,23	8,44	40,93±1,16	9,14	0,12	>0,05
Circle of thorax (breath), sm	108,45±1,8	4,8	115,88±2,54	6,48	1,03	>0,05
Circle of thorax (exhalation), sm	103,22±1,81	5,32	105,08±2,21	6,19	0,52	>0,05
Circle of biceps, sm	42,14±1,8	13,05	43,56±1,55	10,50	0,48	>0,05
Circle of waist, sm	78,72±2,29	8,58	80,31±2,4	9,03	0,38	>0,05
Circle of hip, sm	77,42±1,74	6,46	78,12±1,8	6,79	0,23	>0,05
Circle of shin, sm	39,53±1,28	9,55	40,29±1,38	10,11	0,33	>0,05
Circle of forearm, sm	36,58±1,29	10,42	38,38±1,81	13,92	0,66	>0,05

Table 4

Average values of reduction of anthropometrical data of highly skilled bodybuilders of the mesomorphic type of constitution of control and experimental groups at the end of the competitive period (n1=n2=8)

Indicators	CGG	EG	T	P
	$\bar{X}_1 \pm m_1$	$\bar{X}_2 \pm m_2$		
Body weight, kg	11,11±1,0	4,75±0,3	5,14	<0,01
Circle of neck, sm	3,8±0,4	1,9±0,2	3,67	<0,01
Circle of thorax (breath), sm	4,9±0,4	2,0±0,3	4,5	<0,01
Circle of thorax (exhalation), sm	4,9±0,4	2,3±0,2	5,79	<0,01
Circle of biceps, sm	3,1±0,5	1,7±0,3	2,07	>0,05
Circle of waist, sm	4,6±0,4	2,5±0,2	3,95	<0,01
Circle of hip, sm	4,1±0,3	2,3±0,2	3,6 4	<0,01
Circle of shin, sm	2,3±0,2	1,4±0,2	3,01	<0,05
Circle of forearm, sm	0,2±0,1	0,8±0,3	1,52	>0,05

Coefficients of variation of all main anthropometrical indicators, separately for control and experimental groups, practically did not exceed the general initial level. For example, it made V=10,69% for the mass of the control group, for the experimental group – V=12,05%. Respectively, coefficients of variation made the following values for control and experimental groups: circle of hips of V=6,46%, V=6,79%; waist circle – V=8,58%, V=9,03%; biceps circle – V=13,05%, V=10,5%.

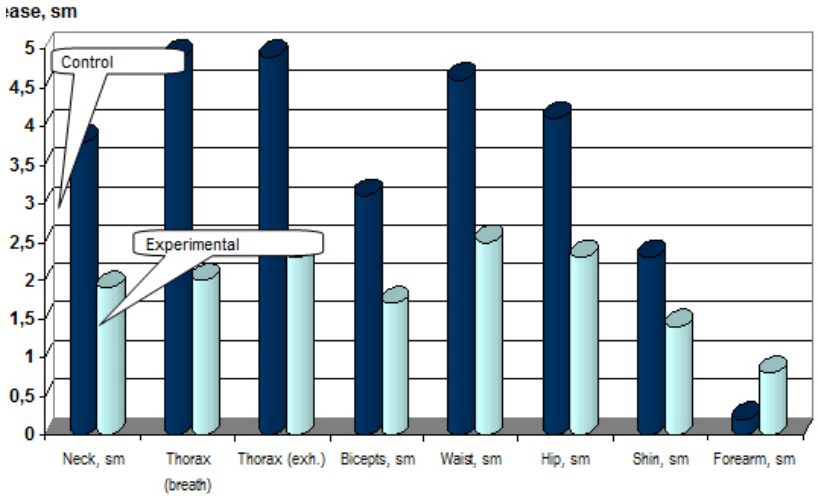
So, the probability of distinctions were confirmed at the end of the competitive period of preparation: in body weight (control – 11,11 kg, experimental – 4,75 kg; P<0,01); waist circles (respectively 4,6 sm, 2,5 sm; P<0,01); hip circles (respectively 4,1 sm, 2,3 sm; P<0,05); neck circles (respectively 3,8 sm, 1,9 cm; P<0,01); thorax on breath (respectively 4,9 sm, 2,0 sm; P<0,01) and on exhalation (respectively 4,9 sm, 2,3 sm; P<0,01) and shins (respectively 2,3 sm, 1,4 sm; P<0,05).

Conclusions

Thus, efficiency of the technique of the training process of highly skilled bodybuilders of the mesomorphic type of constitution was proved. The result allows considering that the effect was more expressed in EG, and the level of preparedness can be estimated as optimum. The dynamics of loading in this group significantly reduces the probability of formation of adverse displacements of functional condition of sportsmen (overstrain, overtraining, injuries), allows to reach the necessary level of sportswear without overstrain of adaptation and compensatory mechanisms. Concerning the creation of training process, the training method in EG promotes burning of fatty layer and hypodermic water more (on body weight indicators (t=5,14; p<0,001), thorax circles on breath (t=4,5; p<0,001) and exhalation (t=5,79; p<0,001), waists (t=3,95; p<0,001), hips (t=3,64; P<0,01) and shins (t=3,01; p<0,05)).

The offered training method for highly skilled bodybuilders of the mesomorphic type of constitution in the competitive period can be recommended for training of sportsmen, at the observance of requirements of sports and medical control, ensuring effective and high-quality restoration in the transition period.

Further researches have to include the development and foundation of the training process of highly skilled bodybuilders of the mesomorphic type of constitution in the transition period.



Pic. 1. The comparative diagram of the gain of anthropometrical data of highly skilled bodybuilders of the mesomorphic constitution of control and experimental groups in the competitive period

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