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CORRELATION DEPENDENCE OF THE USE OF GENERAL AND SPECIAL-PREPARATORY (BOXING EQUIPMENT) EXERCISES AND PSYCHOPHYSIOLOGICAL INDICATORS AND THE LEVEL OF MANIFESTATION OF THE STRENGTH OF PUNCHES BY YOUNG BOXERS OF 15-16 YEARS OLD

Yuri Shestak

Viacheslav Mulyk

Kharkiv State Academy of Physical Culture,

Kharkiv, Ukraine

Purpose: to establish a correlation relationship between general and special preparatory exercises and strength indicators of punches with hands, as well as psychophysiological qualities that arise during training.

Material and methods: the research was carried out with the involvement of young boxers 15-16 years old, who made up an experimental group in the amount of 12 athletes, they carried out a one-cycle annual training process according to the CYSS program at the beginning of the preparatory period (control testing was carried out after the retractive mesocycle), and at the end of the competitive period repeated testing was carried out using the means of general and special physical training and psychophysiological indicators. The above made it possible to establish a correlation dependence between the indicated indicators.

Results: the results obtained allow, when building a training process aimed at increasing the absolute and relative strength of a punch in boxing, to take into account the effectiveness of using general and special preparatory exercises in relation to the main punching movements of boxers.

Conclusions: the results obtained make it possible to more effectively plan the training process with the use of general and special-preparatory exercises for solving problems of the development of speed-strength qualities, which are the basis of the absolute and relative strength of the punch in boxing.

Keywords: young boxers, physical exercises, psychophysiological indicators, hand punch force.

Introduction

An important factor in increasing the effectiveness of training young boxers is the influence of the use of preparatory and special-preparatory (including with the use of boxing devices) exercises on the level of power indicators of punches and psychophysiological indicators [8, 11, 12, 13].

Today there is a disagreement in the opinions of coaches on the training impact of general physical training and special physical training on the formation of special physical qualities of athletes [1, 4, 7, 11, 15]. At the same time, it is noted [2, 3, 6, 14] that when selecting means of special physical training, one should be guided by the principle of dynamic correspondence, according to which they must correspond in the structure of movements to the competitive right.

Therefore, the main provisions that should be taken into account when building the training process of young boxers is the interdependence of the exercises used to solve problems related to the development of motor qualities. As noted earlier [9, 11], effective exercises for the development of motor qualities are those exercises in the performance of which muscle groups are involved, taking part in the main motor (competitive) action in terms of the amplitude and direction of movement, as well as the structure of efforts during their execution. In addition, special preparatory exercises contribute to the formation of a functional system that ensures the performance of a competitive exercise [5, 8, 13].

Thus, when forming complexes of exercises, it is necessary to clearly understand how an individual exercise affects the development of motor qualities. Therefore, it is important to establish a correlation relationship between general and special preparatory exercises and indicators of the main motor actions, which are

punches in boxing, and their influence on psychophysiological indicators that are formed under their influence.

Purpose of the study is to establish a correlation relationship between general and special preparatory exercises and strength indicators of punches with hands, as well as psychophysiological qualities that arise during training.

Material and Methods of research

The studies were carried out with the involvement of young boxers 15-16 years old, made up an experimental group in the amount of 12 athletes who carried out a one-cycle one-year training process according to the CYSS program at the beginning of the preparatory period (control testing was carried out after the retracting mesocycle), and at the end of the competitive period, repeated testing was carried out with using the means of general and special physical training and psychophysiological indicators. The above made it possible to establish a correlation dependence between the indicated indicators.

Results of the research

The obtained results allow, when constructing a training process aimed at increasing the absolute and relative strength of a punch in boxing, to take into account the effectiveness of using general and special-preparatory exercises in relation to the main punching movements of boxers.

Table 1

Correlation relationship between indicators of general physical fitness and psychophysiological indicators of young boxers 15-16 years old

№ i/o	Psychophysiological indicators	Indicators of general physical preparation					
		1	2	3	4	5	6
1	Rufier index	0,24	0,25	0,46	0,33	0,50	0,52
2	Romberg test	0,36	0,32	0,40	0,36	0,33	0,30
3	Simple reaction time to sound	0,52	0,44	0,41	0,46	0,30	0,26
4	Selection reaction time	0,34	0,33	0,30	0,42	0,26	0,28
5	Simple reaction time to light	0,30	0,28	0,32	0,38	0,28	0,26
6	Efficiency of work according to the Schulte test	0,48	0,42	0,40	0,36	0,30	0,31
7	Degree of efficiency of the test Schulte	0,45	0,40	0,43	0,38	0,41	0,44
8	Mental stability according to the Schulte test	0,40	0,36	0,32	0,30	0,40	0,52
9	Concentration on the Bourdon test	0,36	0,32	0,31	0,46	0,41	0,38
10	Switching attention with the Bourdon test	0,28	0,41	0,42	0,40	0,38	0,36
11	Tapping test, frequency of movements	0,30	0,38	0,33	0,44	0,42	0,26

Note: GPP indicators: 1) jump up from the spot; 2) throwing a medicine ball from behind the head; 3) throwing a tennis ball from a place; 4) push-up; 5) pull-up on the bar

The analysis of the correlation dependence of various indicators of readiness among young boxers of 15-16 years old established that the use of means of general physical training has mainly an average and below average level of correlation with psychophysiological indicators. The most significant effect of using a standing jump with a response time to sound (r=0,52), push-up with the Ruffier index (r=0,50) and pull-up on the bar with the Ruffier index (r=0,52), mental stability according to the Schulte test (r=0,52).

Table 2

Correlation relationship of the use of indicators of special boxing equipment and psychophysiological indicators of young boxers 15-16 years old

№ i/o	Special physical training exercises	Psychophysiological indicators										
		1	2	3	4	5	6	7	8	9	10	11
1	With a skipping rope	0,61	0,52	0,48	0,51	0,48	0,56	0,55	0,58	0,60	0,58	0,82
2	With a bag	0,60	0,56	0,57	0,65	0,53	0,58	0,56	0,60	0,61	0,60	0,79
3	With pear	0,62	0,54	0,56	0,68	0,54	0,60	0,61	0,61	0,60	0,63	0,80
4	With wall cushion	0,59	0,58	0,59	0,63	0,52	0,57	0,58	0,59	0,61	0,60	0,81
5	With pneumatic bag	0,64	0,56	0,58	0,70	0,56	0,62	0,63	0,63	0,61	0,65	0,80
6	With a ball on elastic bands	0,63	0,57	0,59	0,71	0,57	0,61	0,65	0,63	0,60	0,64	0,81
7	With a small hanging ball	0,61	0,59	0,60	0,72	0,56	0,60	0,64	0,65	0,61	0,63	0,80
8	With boxing bags	0,58	0,61	0,60	0,69	0,60	0,61	0,63	0,64	0,68	0,67	0,78

Note: indicators: 1 - Rufier index; 2 - Romberg's test; 3 - time of a simple reaction to sound; 4 - selection reaction time; 5 - time of a simple reaction to light; 6 - efficiency of work according to the Schulte test; 7 - degree of efficiency of the test Schulte; 8 - mental stability according to the Schulte test; 9 - concentration of attention according to the Bourdon test; 10 - switching attention with the Bourdon test; 11 - tapping test, frequency of movements

The use of special boxing exercises, to a greater extent than preparatory exercises, influences the formation of psychophysiological indicators of young boxers aged 15-16 (Table 3).

So, exercises with a skipping rope have a significant correlation for almost all studied psychophysiological indicators, the largest of which is the tapping test data (r=0,82). Exercises with a "bag" and "pear" have the greatest correlation with the Rufier Index (r=0,60; 0,62), the choice reaction time (r=0,65; 0,68), mental stability according to the Schulte test (r=0,60; 0,61), concentration and attention switching with the Bourdon test (r=0,61; 0,60; 0,60; 0,63) and tapping test (r=0,79; 0,80).

Table 3

Correlation relationship between the indicators of special exercises and indicators of the power of kicks of young boxers 15-16 years old

№ i/o	Special physical training exercises	Kick force indicators			
		1	2	3	4
1	With a skipping rope	0,32	0,30	0,36	0,35
2	With a bag	0,67	0,62	0,61	0,60
3	With pear	0,51	0,50	0,50	0,49
4	With wall cushion	0,71	0,68	0,67	0,64
5	With pneumatic bag	0,57	0,54	0,52	0,50
6	With a ball on elastic bands	0,54	0,52	0,50	0,50
7	With a small hanging ball	0,51	0,50	0,52	0,51
8	With boxing bags	0,60	0,58	0,57	0,54

Note: indicators: 1 - F_{abs} (absolute strength; direct kick) 2 - F_{abs} (absolute strength; side kick) 3 - F_{rel} (relative strength; direct kick) 4 F_{rel} (relative strength; side kick).

The use of the “wall pillow” exercise significantly correlates with the choice reaction time (r=0,70), work efficiency and the degree of work capacity according to the Schulte test (r=0,63). Exercises requiring the manifestation of a reaction of choice: with a pneumatic bag and with a ball on elastic bands correlate with the Rufier index (r=0,64; 0,63), choice reaction time (r=0,70; 0,71), work efficiency , the degree of working capacity and psychophysiological stability according to the Schulte test (r=0,62; 0,61; 0,63; 0,65; 0,63; 0,63), concentration and attention switching with the Schulte test (r=0,61; 0,60; 0,65; 0,64) and the tapping test (r=0,80; 0,81). The performance of exercises with a small hanging ball and boxing paws by young boxers 15-16 years old significantly correlates with the time of a simple reaction to sound (r=0,60; 0,60), choice reaction time (r=0,72; 0,69), efficiency of work, degree of efficiency and mental stability according to the Schulte test (r=0,60; 0,61; 0,64; 0,63; 0,65; 0,64), as well as concentration and attention switching with the Bourdon test (r=0,61; 0,68; 0,63; 0,67) and, to a greater extent, exercises with boxing paws (r=0,81; 0,78). The use of special boxing equipment has a correlation with all manifestations of strength indicators.

So, the use of exercises with a "bag" affects the absolute and relative strength of the direct and lateral impact (r=0,67; 0,62; 0,61; 0,60), with the "pear" (according to r=0,51; 0,50; 0,50; 0,49), with a wall cushion (r=0,71; 0,68; 0,67; 0,64), with a pneumatic bulb (r=0,57; 0,54; 0,52; 0,50), with a ball with elastic bands (r=0,54;

0,52; 0,50; 0,50), with a small hanging ball (r=0,51; 0,50; 0,52; 0,51) and with boxing paws (r=0,60; 0,58; 0,57; 0,54). That is, the greatest manifestation of the power of blows is carried out due to boxing equipment, which is immovable, and there is an opportunity to put in the maximum blow (exercises with a bag, with a wall pillow).

In turn, the use of most of the physical training means does not have a significant correlation with the indicators of the absolute and relative strength of kicks and lateral kicks in young boxers 15-16 years old (Table 4).

Table 4

Correlation relationship between indicators of absolute and relative strength of kicks with hands and indicators of GPP

№ i/o	Indicators of absolute and relative strength of kicks	Показники ЗФП				
		1	2	3	4	5
1	F_{abs} (absolute strength; direct kick)	0,37	0,21	0,42	0,56	0,36
2	F_{abs} (absolute strength; side kick)	0,32	0,20	0,38	0,46	0,32
3	F_{rel} (relative strength; direct kick)	0,40	0,24	0,46	0,54	0,38
4	F_{rel} (relative strength; side kick).	0,36	0,22	0,44	0,52	0,36

Note: GPP indicators: 1 - medicine ball throw; 2 - long jump from a place; 3 push-ups for 30 s; 4 - pull-ups on the crossbar in 30 s; 5 - hand dynamometry

The most significant correlation was found in pull-ups on the crossbar for 30 s: Fabs (direct kick) r=0,56; Frel (direct kick) r=0,54 and Fabs (side kick) r=0,52 and push-ups for 30 s: F_{abs} (direct kick) r=0,52; F_{abs} (side kick) r=0,50; F_{rel} (direct kick) r=0,56.

That is, the use of preparatory exercises in their structure of movements and the manifestation of efforts do not have much significance in increasing the strength of kicks.

Conclusions / Discussion

The obtained results allow more effective planning of the training process with the use of general and special training exercises to solve problems related to the development of speed and strength qualities.

It was found that the greatest correlation with the indicators of the strength of the kicks of young boxers have exercises with the use of boxing equipment, which is

immovable (exercises with a bag, with a wall pear, with boxing bags), in turn, the use of kicks on motor objects to a greater extent affects the psychophysiological indicators (time of simple reaction to sound, light and choice).

The effectiveness of the use of preparatory exercises for the development of indices of absolute and relative strength of kicks with hands is less significant, since they do not correspond to the structure and dynamics of the boxer's punching movements.

Prospects for further research provide for the development of the training process of young boxers 15-16 years old, taking into account the use of the correlation relationship of the means of general physical training, special physical training and psychophysiological indicators.

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Information about the Authors

Yuri Shestak: graduate student; Kharkiv State Academy of Physical Culture: 61058, Kharkiv, st. Klochkivska, 99, Ukraine.
ORCID: https://orcid.org/0000-0003-1489-9849
E-mail: oips.hdafk@gmail.com

Viacheslav Mulyk: Doctor of Sciences (Physical Education and Sports), Professor; Kharkiv State Academy of Physical Culture: 61058, Kharkiv, st. Klochkivska, 99, Ukraine.
ORCID: https://orcid.org/0000-0002-4441-1253
E-mail: mulyk.viacheslav@gmail.com