

## Conditions for improving basic sports training of 13-14-year-old boxers

LYUDMILA D. NAZARENKO<sup>1\*</sup>, IGOR S. KOLESNIK<sup>2</sup>

<sup>1</sup> Department of Human Biology and Basic Medical Training, Ilya Ulyanov State Pedagogical University, 100-letiya Square since the birth of V. I. Lenin 4, 432700, Ulyanovsk, RUSSIAN FEDERATION

<sup>2</sup> Department of Theories and Techniques of Physical Culture, Health and Safety, Ilya Ulyanov State Pedagogical University, 100-letiya Square since the birth of V. I. Lenin 4, 432700, Ulyanovsk, RUSSIAN FEDERATION

Published online: December 30, 2017

(Accepted for publication December 02, 2017)

DOI:10.7752/jpes.2017.04279

### Abstract

At the basic stage of learning, sports training of 13-14-year-old boxers should maintain the interest in a chosen type of sports activity with regard to motivation. This predetermines the necessity of searching for new approaches to the sports training of boxers, finding external and latent properties, abilities, and capacities of the organism to achieve future goals in sports. This research investigates the conditions for improving basic sports training of adolescents. Such conditions determine the training efficiency and competitive activities, raise the number of successful bouts, and requires considering demands for the purpose of sportsmanship improvement. This ensures not only the maintenance, but also sparks the interest in boxing, which evolves into a need for training load and self-fulfillment by means of the chosen sport.

**Keywords:** training conditions, sports improvement, teenager boxers.

### Introduction

Boxing is a popular sport that draws the attention of adolescents and young men. The success and achievements of Russian boxers are recognized worldwide. However, increasing level of sportsmanship among boxers from various countries, new scientific data on the improving modern technologies of technical and tactical training determine the necessity of searching for new ways to optimize the training and competitive activity in order to improve its efficiency (Baranov, 2004; Wu, 2003).

According to the Sanitary and Epidemiological Requirements to Additional Education for Children Institutions (extracurricular institutions) (SER 2.4.4.1251-03) approved in the Russian Federation, the minimum age for enrolling children in schools for boxing training is 10 (Akopyan et al., 2007). Most researchers agree that one can start boxing training at the age of 12-14 (Akopyan et al., 2007; Atilov, 2005; Platonov, 2013; Roberts & Smith, 2014). This means that the basic training period often coincides with puberty, which predetermines the orientation and intensity of training loads. It is important not to force training (Platonov, 2015) and to take into consideration the age- and gender-related individual features of athletes.

The duration of basic sports training of 13-14-year-old boxers is determined by a number of conditions and factors: preparing organism for systematic training sessions with regard to the peculiarities of adolescent's adaptation to muscular loads; choosing the most effective teaching methods, which stimulate the motor and cognitive activity; motivating to do sports consistently; motor characteristics, etc. (Demchenko et al., 2014; Kulikov et al., 2011; Platonov, 2013).

The specific features of sports training of 13-14-year-old boxers during basic training is determined by the need for discovering latent properties of the organism, which provide the adolescent's readiness for exercises in the chosen sports activity (Gaskov & Kuzmin, 2010; Demchenko et al., 2014; Khokhla & Pavlos, 2017). This is preconditioned by the focus of boxing on developing skills of resisting psychic, physical, and tactical impact of the opponent during a bout with a real threat of sustaining serious injury (Di Russo & Spinelli, 2010; McCrory, 2008; Unterharnscheidt, 2003).

Many coaches focus on developing physical fitness as a basis for mastering attacking and defensive techniques (Baranov & Baranov, 2008; Bastian, 1998; Bibikov, 2008; Qian, 2015; Starosta, 1999; Ruiz-Montero & Chiva-Bartoll, 2017). However, they underestimate the importance of psychological development – perception, attention, and analytical abilities, which make a person focus on an independent search for ways of self-fulfillment and practical use of acquired skills and abilities. The person has to control his motions while fighting the opponent, as well as to anticipate the nature of their execution with regard to space-and-time and space-and-force parameters of motion, to develop the ability of timely concentration and attention switch. During the basic training of young boxers, attention is traditionally focused on physical training, although many researchers and coaches argue that it is necessary to develop motivation and train young boxers psychologically

(Demchenko et al., 2014; Kolesnik, 2010). However, there are no methods for pedagogical and psychological approach to boxing adolescents. Therefore, research method that we have used covers these aspects of training.

Basic sports training of 13-14-year-old boxers can be improved by taking a step beyond the traditional ideas of training process organization. Many boxing experts argue that the main objectives of basic sports training are to develop a system of knowledge (history, rules, theory and training methods) (Atilov, 2005; Roberts & Smith, 2014; Shiryaev, 2002), to teach the basic boxer stance, motions, and distance (Baranov, 2004; V. Baranov & D. Baranov, 2008; Sannikov & Voropayev, 2006), to improve physical fitness (Kolesnik, 2010; Sannikov & Voropayev, 2006), to develop motivation, skills of regulating one's mind and emotions, to raise interest in boxing (Kolesnik, 2007), to develop volitional capacity (Akopyan et al., 2007; Wu, 2003), to provide all-round development (Newton & Kraemer, 1994), and to improve health (Di Russo & Spinelli, 2010; Unterharnscheidt, 2003).

Boxing is one of the few types of sport that requires skills of self-preservation and self-protection, since every competing combatant looks to deliver a strong and precise punch to his opponent to achieve victory (Unterharnscheidt, 2003). A boxer's sportsmanship depends on successful execution attack and a timely dodge of the opponent's punch (Akopyan et al., 2007; Kolesnik, 2010; Wu, 2003). Modern studies (Di Russo & Spinelli, 2010; Karakukcu et al., 2013; Kolesnik, 2007; McCrory, 2008; Unterharnscheidt, 2003) focus on boxer's health issues especially relevant for the adolescent age with its intensive asynchronous physical and mental development.

Developing motor characteristics during basic training is the key aspect; special attention is paid to punching force (Lenetsky et al., 2013; Pierce et al., 2006; Smith, 2006), muscular power (Kawamori & Haff, 2004; Newton & Kraemer, 1994), isometric strength (Guidetti et al., 2002), agility and coordination improvement (Qian, 2015), and endurance (De Lira et al., 2013; El-Ashker & Nasr, 2012; Khanna & Manna, 2006; Pierce et al., 2006; Smith, 2006).

Basic training programs for young boxers focus primarily on physical training (Kalmykov et al., 2009; Sannikov & Voropayev, 2006; Shulika, 2009); however, their competitive activity analysis shows that technical and tactical training affects the success more than physical training does (Gaskov & Kuzmin, 2010). In addition to mastering techniques, emphasis should be placed on the variety of their use in various situations (Oskolkov, 2016). To that end, competitive activity (Petrov & Kolesnik, 2009; Strelnikov, Durinov, & Dashiev, 2011; Shulika, 2009) and coordination exercises (Qian, 2015) are used. Experts assume that in the near future, boxing training will be focused on universal tactics, original and individual techniques, and considerable improvement of general and special training (Gaskov & Kuzmin, 2010; Strelnikov et al., 2011), the groundwork for which should be laid during the basic training of young boxers.

This type of sports activity imposes a number of requirements to the athlete's organism, which necessitates developing adaptive reactions to rapidly changing conditions that dictate the display of maximal mobilization of muscular and emotional-psychic efforts with a view to overcoming anxiety, sensations of pain and other uncomfortable processes. A system of multiform relationships with the opponent is created during a bout, which allows considering athletes' movement as a complex model of interaction between competing parties, which imposes requirements to the process of mobilizing organism's functional capacities (Kolesnik, 2010; Bolotin & Bakayev, 2017).

Studies feature increasingly more data on the need to take into consideration not only the physical characteristics, but also the psychological traits of young boxers not only during the selection stage, but also during the training program design. For instance, Demchenko, Yatsin, and Salnikov (2014) argue that quickness and strength are being developed better in adolescents with a weak nervous system and mediocre nervous process mobility, while strength and endurance – in adolescents with a mobile nervous system. Shiryaev's studies (2002) showed that some boxers-novices tend to overestimate themselves – they are more impulsive and require strict control of their actions, while others, on the contrary, tend to underestimate their abilities and skills, express heightened anxiety, and be excessively cautious when choosing their moves. Therefore, at this stage of sports training, one should consider the individual, typological, morphological, and psycho-functional characteristics of the athlete when designing the training program.

## Methods

We have conducted a pedagogical experiment to verify the efficiency of sports training method for combatant-novices. The experiment included 39 13-14-year-old boxers (control group (CG) – 19 adolescents, experimental group (EG) – 20 persons). A test was carried out before the pedagogical experiment was started to assess the initial level of physical fitness (running – 30 meters, 100 meters, 1000 meters, standing long jump, pull-ups from a hanging position, 4 kg shot put) and technical competence (number of mastered attacking moves used in competitive activity, individual features of applying attacking and defensive techniques, frequency of distance change during a round, number and diversity of defensive techniques used, ability to increase the speed of motions by the end of the round).

The level of technical competence was evaluated by a five-point system. The expert group (n=5) included highly skilled coaches from children's sports schools and sports clubs. Resulting data analysis showed no significant differences in the levels of technical competence of CG and EG boxers ( $p>0.05$ ).

At the CG, training sessions were conducted in accordance with the generally accepted methods of the sports training program (2007) (Atilov, 2005), approved by the Boxing Federation of Russia. The EG used our sports training method that was based on providing specific conditions for improving training efficiency and competitive activity.

## Results

Boxing is the third most popular sport. Its specific feature is that there is a great number of various dangerous situations, when a person can have injuries, bruises, knockdown, and knockout. This requires a high level of composure, confidence, willpower, perseverance, persistence, and other moral and volitional qualities – the basis for forming solid and diverse movement skills. This determines the need in purposefully developing and improving moral and volitional qualities (Kolesnik, 2007, 2010).

Boxing attracts many adolescents and young men by the possibility of self-affirmation, improving confidence and learning an effective way of self-defense. Other athletes consider boxing as a powerful means of dealing with stressful situations; they see its beauty in the victory of intelligence, resourcefulness, and determination over brute force and aggression, in the ingenious avoidance of a knockout or knockdown.

Boxers should master the basic attacking and defensive moves during basic sports training, as well as basic tactical techniques. However, training sports reserves capable of providing a worthy replacement for strong combatants requires setting and solving complex problems:

- realizing the essence of boxing, its impact on physical and spiritual-moral development of an individual;
- sparking interest in boxing;
- making parallel between adolescent's character, actions, behavior, abilities and capacities;
- learning knowledge of boxing (history, changes in rules, further development trends);
- mentally preparing the athletes for both victories and defeat (treating defeats in the ring as a structural component of sports training).

Therefore, basic sports training involves such an important element as determining the motivation for choosing boxing, abilities, skills and predisposition to the chosen sport, the level of moral-volitional qualities, habits, behavior, and readiness to comply with the established discipline. Basic sports training is characterized by unstable motives for choosing a sport, the lack of awareness of one's abilities, skills and needs, and the domination of external motives over internal ones (Kolesnik, 2007; Guidetti et al., 2002). Motivation is considerably affected by the social assessment of sport results. The public interest in achieving sport victories at any cost to enhance the stature of the country and/or region makes personal and prestige-related motives and inflated self-esteem dominant. The need for an all-round, socially active individual dictates the necessity of encouraging meaning-making motives that are characterized by setting a system of goals. Objective goal setting is determined by a comprehensive character research made for the purpose of discovering typological, hereditary, and other individual traits of a boxer, including the level of his emotional-volitional qualities: willpower, perseverance, diligence, honesty, commitment to principles, composure, independence, good self-discipline, sympathy, etc. As sportsmanship is being developed, comes life goals are re-assessed and the initial goal is transformed into a more long-term one.

Basic boxing training is effective due to a comprehensive approach to designing mental, physical, and technical training of young boxers.

The level of physical and tactical training that requires participation in competitions at its basic stage is related to the following conditions:

- developing skills of maintaining body stability in stressful situations of a bout;
- developing the ability to anticipate the opponent's moves;
- improving skills of using the set of defensive actions while executing the punch;
- ability to accumulate and use the training and competitive experience to improve the control over one's own motions in the ring, etc.

*Maintaining high body stability in the stressful situations of a bout* is one of the key latent properties of the boxer's organism. The optimal level of stability creates the necessary prerequisites for confidence, free and light movement, which makes attacking and defensive actions effective, as well as prerequisites for rational maneuvering to finding the best moment for the attack. The slightest loss of stability leads to constrained movements, psycho-emotional tension, constrained motion amplitude, reduced power and accuracy of punches (Demchenko et al., 2014). In a stressful situation, stability level achieved during training is reduced significantly. This is one of the main reasons for unsuccessful performance.

Determining combatant's natural ability to maintain body stability while interacting with the opponent in the ring, as well as the search for means and ways to improve the level of balance maintenance by means of rational positioning and repositioning of body parts in space and time, creates prerequisites for developing psychological and technical-tactical readiness of the combatant for successful competitive activity. Good body stability during training does not guarantee its maintenance during a bout with an opponent. Heavy stress caused by letting a punch go through leads to in coordination in the activity of nerve centers, which causes a tilt of nervous processes and disruption of movement coordination. Maintaining fighting capacity requires heavy

concentration of volitional efforts and focus on the opponent's actions, as well as quick preparation for a counterpunch. At that, it is important to avoid a pause that would drop the pace of movement. This movement problem can be solved with skills of rational maneuvering that ensure the maintenance of a rational pace of motions (Galkin, 2002).

According to the basic training program for boxers, each training session involves special physical exercises that develop skills of maintaining body stability in difficult situations of a bout:

- sparring with a weighted belt or weighted sneakers;
- working with boxing equipment with closed eyes;
- executing attacks with a partner at a quickened pace;
- executing attacks while interacting with two and three partners;
- training bout after a training session in a fatigued state.

Movement initiative and freedom are often constrained by emotions of fear. They limit the choice of techniques and diversity of technical and tactical actions, and induce stress when facing a threat of a knockout or knockdown. The emergence of fear can have various types and forms: from uncertainty to panic. Negative emotions weaken volitional powers, disorganize behavior, and reduce activity by limiting it to passive and defensive actions.

Overcoming the sense of fear – the main negative emotion, requires identifying both obvious, surface reasons (negative experience of participation in the previous bout, insufficient recovery from a sustained injury, etc.) and in-depth ones (danger experienced during childhood). The main reasons that cause anxiety are as follows:

- insufficient level of physical fitness and technical-tactical competence;
- weak control over one's psychological and emotional state;
- underestimation of psychological regulation and self-regulation techniques as an integral part of a boxer's training;
- insufficient experience of competitive activities;
- considerable discrepancy between the orientation of training and the specific features of competitions.

Most reasons that cause fear before a bout are related to flaws in organizing the training process.

A set of special movement exercises was used to improve skills of maintaining body balance in stressful situations of a bout:

- training bout in a smaller ring;
- training bout at a sports festival before numerous spectators;
- exercises with sports equipment with a time limit.

Developing skills of controlling the nature of opponent's moves is the next condition for improving the efficiency of basic boxing training. This determines the need for a timely adjustment of one's own movement program. The more precise is the coordination of movements, the better the attacking boxer dodges his opponent's punches and seizes the initiative. These skills should be developed during every training session by means of sparring, training bouts, and bouts with two partners simultaneously. This helps to develop perception skills and assess the opponent's movements objectively (Akopyan et al., 2007; Galkin, 2002; Kulikov et al., 2011).

Skills of controlling the opponent's movements in order to detect the moment to start an attack were developed by the following movement exercises:

- monitoring the motor activity of the partner and repeating all the actions that were performed during one round;
- executing various attacks in a predetermined sequence, their types and ways of performance, used in one round;
- performing two-three defensive maneuvers per opponent's defensive maneuver;
- using all types of distance while executing an attack;
- improving the maneuvering before executing each attack.

The focus, pace and rhythm of the attacking boxer's movement are mostly determined by the opponent's motions. Thus, combatant has to adjust the program of his motions constantly. Therefore, it is important to predict the form of the opponent's attack.

The better an athlete knows the basics of rational attacking techniques, their types and ways of execution that are determined by individual characteristics (height, weight, length of arms and legs, motor reaction speed, etc.), the more successful the training and competitive bouts are (Kolesnik, 2007; Starosta, 1999). This determines the need to gather preliminary information about the potential opponent, his obvious and latent abilities. The lack of such information significantly limits the possibilities of the attacking boxer of realizing his potential abilities.

Anticipating the opponent's actions allows timely dodging the opponent's punch and counterattacking with an anticipating move, thus putting him in a difficult situation. At that, it is necessary to understand that any experienced opponent faces the need to solve the same task.

This determines the need for mastering feints and a set of various defensive techniques. Masterful feints

allow disorienting the opponent and successfully executing the planned attack. The set of various defensive techniques enables avoiding powerful punches and reducing the strength of the attack. Precision in predicting the nature of interaction between the combatants depends on the experience and analysis of the possible options of the opponent's movement.

The ability to anticipate the opponent's actions was improved by doing the following tasks while watching the partners (opponents):

- identifying the techniques most often used during the training bout;
- determining the sequence of various attacks;
- determining the peculiarities of executing punches by the following features: taking a stance, choosing an initial position, number and type of preparatory actions, spatial location of body parts, etc.

Mastering a wide range of various defensive maneuvers is a key condition for dodging the opponent's punch; therefore, the number of mastered defensive maneuvers is an important indicator of boxers' technical competence at the basic stage of training. The boxer's readiness for effective defense is determined by the use of blocking with arms (elbows, gloves, shoulders), evasion (ducking, slipping, pulling away, bobbing), change of distance, increase of movement pace, etc.

Boxing with an opponent with a different style, level of sportsmanship, and experience in competitive activity allows diversifying the content of the bout and constantly looking for new ways of executing techniques. This helps to accumulate gradually and enrich the training/competitive experience. Accumulating information on various approaches to organizing competitive activity between opponents of different skill, age, and style is a necessary condition for effective basic sports training of 13-14-year-old boxers.

The ability to accumulate and use the training/competitive experience was determined by the skills of individual improvisation during a bout with one or two partners.

An important tactical moment for further sports training is the beginning of a new stage of training for upcoming competitions with original variants of mastered physical exercises, unexpected combinations thereof, various algorithms of movements, unusual initial and final positions, and developing a contemporary model of boxer's individual movement program with regard to his gained experience in competitive activity (Kolesnik, 2010).

Psychological training is as important during the basic training of 13-14-year-old boxers as the development of movement characteristics, technical and tactical skills. The search for ways of more efficient management of a boxer's sports training should be considered in conjunction with the solution of personality development problems. The established practice of organizing training and competitive activities pays insufficient attention to the study, analysis, and development of personality traits.

13-14-year-old boxers are notable for their perception of reality; they overreact to successes and failures, and assess their capabilities inadequately. This determines the need for studying the individual peculiarities of each adolescent and analyzing the emerging relationship between the coach and the trainee, which determines the choice of specific ways of pedagogical influence (Strelnikov et al., 2011). With all the variety of individual differences, sports teacher should use various methods to study the personality traits of each trainee and his kinesiological potential to predict his achievements and develop an individual training regime.

As movement abilities and skills have been developed, physical fitness and technical-tactical competence – improved, training objectives become more complex. The conscientious and honest attitude to the coach's assignments is fostered as the interest in the chosen type of sport sparks. At the first stage of training movement exercises are performed under the supervision of a teacher; at the second stage, they are performed individually, based on the acquired knowledge and movement skills.

The coach, who models sports training and young boxer's personality development, has to provide targeted and consistent pedagogical influence, continuous stating and solution of problems to improve sportsmanship and spiritual-moral development (Galkin, 2002; Sannikov & Voropayev, 2006; Shchitov, 2007). Setting concrete goals and stating problems helps to form a well-planned program of actions and optimizes the functional system that provides rational interaction between motor and vegetative functions.

The system of pedagogical influence is expanded and complicated by new means, methods, and techniques. As the sportsmanship is being developed, studied techniques are transformed into more complicated ones by changing initial and final positions, using various means and techniques, developing personality traits, consolidating positive actions through encouragement, using a system of various creative assignments, etc.

Cognition development is closely related to the development of personality traits: purposefulness, perseverance, initiative, diligence, discipline, etc. The special system of assignments involving objective assessment of one's activities and actions is used to form a habit of self-analysis, analysis of a teammate's activities, control and self-control over the work at the gym and in any other field of endeavor (Kolesnik, 2010). Expanding the number of movement abilities and skills, as well as developing a system of special theoretical knowledge, creates conditions for learning the kinesiological potential as a prerequisite for finding new directions and approaches to improving sports training. The variation of training conditions lays the groundwork for improving personality traits and, primarily, volitional properties: determination, sense of purpose, responsibility, and courage in making risky decisions. Creating variable conditions provides dynamic and changing training process as a necessary condition for its individualization even during basic sports training. At

different levels of typological and genetic abilities and skills, different techniques and means of pedagogical stimulation are used (Akopyan et al., 2007; Guidetti et al., 2002).

Scientific and methodological literature analysis, pedagogical experience generalization, and our research results have showed that conditions for improving basic training of adolescents aged 13-14 as a sports reserve are as follows:

- creating a situation of success;
- improving sport results;
- developing and improving perception, attention, analytical abilities that help to anticipate the opponent's actions and detect peculiarities of the bout;
- improving reaction speed for adequately assessing the situation in the ring and timely counterattacking or dodging an opponent's punch;
- developing skills of detecting peculiarities of fighting in the ring to adjust the fighting program.

Creating a situation of success is an important condition for improving basic training of adolescents aged 13-14 as a sports reserve, and for sparking interest in boxing. In boxing, as in other types of sports, defeats are unavoidable. However, even after losing a bout, a combatant-novice should stay confident, understand the reasons behind the unsuccessful bout, and design an algorithm for their elimination.

The second pedagogical experiment consolidated the skills of fighting the opponent. We have created situations of the subject's success during the experiment. To that end, an experimental group boxer was given the opportunity to choose a "convenient" opponent. Since the combatant was well aware of the opponent's strengths and weaknesses in terms of physical fitness and technical-tactical competence, he used the most effective defensive maneuvers that did not allow the opponent to execute an attack, and counterattacked while increasing the movement pace, changing distance, ways and rhythm of movement when the opponent did not expect it.

It is important to consider the improvement of sport results. The pursuit of the highest achievement at any cost may lead to health deterioration. Intensive trainings cause various forms of temporary immunodeficiency with various negative consequences: injuries, illnesses, increased anxiety and aggressiveness (Kolesnik, 2007; Wu, 2003). Reorientation on leadership in sports at any cost causes changes in the system of social values and public opinions of sports. Such an approach to training contradicts its main social focus – forming healthy and all-round individuals. Boxing has significant innate possibilities for affecting an individual's mental world, life culture and healthy lifestyle. The diverse sports activity in boxing gives ample opportunities for developing intellectual creative skills and moral self-improvement.

In the course of pedagogical experiment, we have studied boxer's behavior after a defeat, peculiarities of his attitude to training sessions, and his performance when it comes to movement exercises for correcting mistakes. We have explained the athletes the importance of developing and improving perception, attention, analytical abilities and other intellectual qualities in order to improve the training outcomes and competitive activities.

In the course of the second pedagogical experiment, experimental group boxers performed special movement exercises to improve perception and attention, and to increase the motor reaction speed. To that end, training bouts with two partners simultaneously were conducted. The goal of the bout with a well-prepared opponent was not to let a single punch go through during one round while using to the full extent all the mastered defensive maneuvers, feints, etc.

Good perception allows understanding clearly the nature of the opponent's actions and behavior during a bout, his movement speed, frequency of the movement pace change, peculiarities of the individual rhythm, the correlation between attacking and defensive actions, the level of orientation in space-and-time and space-and-force parameters of motions (Kolesnik, 2010; Nazarenko, 2003).

We have used various methods to study the punching technique while watching a bout between highly skilled athletes with a subsequent analysis of the most important and difficult moments in order to master the objective regularities of interaction between the competing combatants.

Optimal attention helped to keep in sight the preparation for a punch, concentrate on detecting the moment to punch, and reveal the dependence of fight results on the speed of motor reaction. Experimental group boxers have learned the interrelation between the motor reaction speed, attacking and defensive actions. Athletes had to learn how to gather information about the opponent's peculiarities of behavior in the ring and take all necessary measures to disorient him in their own manner of fighting.

The extreme conditions of training and competitive bouts are related to the constant control over one's psycho-emotional state, proper reactions to constantly changing situations, and unpredictability of opponent's actions. The result-oriented mechanisms are programmed with rationally set and corrected goals and motives of training/competitive activities, wherein a significant role is played by volitional regulation of muscular activity, as well as by skills of determining the peculiarities of the bout course to correct the fighting program.

Learning to analyze each training and competitive fight allows finding typical and individual mistakes and the reasons behind them, as well as determining ways of correcting them. Thus, there should be developed and improved analytical activity.

Mental regulation is about controlling the psycho-emotional state in the pre-contest period, in the pre-start state (before the start of the bout), during the bout, between rounds, and after the end of the competitive activity

(Akopyan et al., 2007; Petrov & Kolesnik, 2009; Platonov, 2015).

In order to regulate the psycho-emotional state, it is expedient to involve a young boxer in intellectual activity for elaborating the program of his performance, specifying the techniques that ensure volitional attitude, concretizing the means of pedagogical influences that regulate the level of athlete's psycho-emotional tension.

A second test of general physical fitness and technical competence of control group and experimental group boxers was carried out after the pedagogical experiment in order to determine the dynamics of these characteristics.

The analysis of obtained results shows an improvement in general physical fitness in both groups with a more significant improvement in the experimental group (Table 1). According to our exercise method designed got for boxers at basic sports training, considerable attention was paid to developing the main types of motor coordination: balance, rhythmicity, agility, and accuracy of movement. The growth of each motor coordination index was assessed with regard to athlete's individual abilities, kinesiological potential, typological properties of the nervous system, intellectual and moral-volitional qualities (Kolesnik, 2007; Nazarenko, 2003; Sadowski, 1998; Starosta, 1999).

**Table 1** Physical fitness dynamics of 14-16-year-old boxers

Physical fitness indexes	Initial data ( $\bar{x} \pm S \bar{x}$ )	After experiment ( $\bar{x} \pm S \bar{x}$ )	Index growth, %
Running 30m, s	<u>5.89±0.41</u> 5.97±0.42	<u>5.67±0.44</u> 5.52±0.29	<u>3.73</u> 7.54
Running 100m, s	<u>14.42±0.93</u> 14.51±0.75	<u>14.30±1.34</u> 14.28±0.65	<u>0.83</u> 1.59
Running 3000m, min	<u>15.11±0.88</u> 15.08±1.03	<u>14.87±1.30</u> 14.02±14.77	<u>1.59</u> 7.03
Standing long jump, cm	<u>181.09±8.35</u> 180.11±7.41	<u>184.90±15.63</u> 192.31±14.01*	<u>2.10</u> 6.78
Pull-ups, times	<u>8.70±0.54</u> 8.59±0.71	<u>10.10±0.36*</u> 12.01±0.65*	<u>16.09</u> 39.81
Shot put – right hand, m	<u>4.80±0.31</u> 4.92±0.28	<u>5.03±0.41</u> 5.86±0.32*	<u>4.79</u> 19.11
Shot put – left hand, m	<u>4.07±0.28</u> 4.03±0.25	<u>4.29±0.20</u> 4.79±0.30*	<u>5.41</u> 18.86

*Note:* numerator is the indicators measured in the control group while the denominator is the indicators measured in the experimental group; \* is the validity at  $p < 0.05$  significance point.

The most significant results ( $p > 0.05$ ) were obtained at explosive strength tests (shot put and standing long jump) in the experimental group. The shot put performance indexes in the control group increased by 4.79% with the right hand and by 5.41% with the left hand; in the experimental group, these indexes were significantly higher (19.11% and 18.86%, respectively). Significant changes in the experimental group (192.31±14.01 cm), versus the control group (184.90±15.63 cm) were also found during the standing long jump tests. The developed method also had a positive effect on strength gain. The indexes of pull-ups increased significantly ( $p > 0.05$ ) in both the control and experimental group – by 16.09% and 39.81%, respectively.

The developed method was more effective than the standard one in developing endurance. For instance, 3000 m running indexes in the control group have increased by only 1.59%, while those in the experimental group – by 7.03%. Significant differences in speed characteristics were found in neither the control nor the experimental group, although the results of 30 m and 100 m running tests were higher in the experimental group than in the control group.

A significant difference between the growth of physical fitness indexes of control group and experimental group boxers is caused by precise requirements to the sports training of experimental group boxers.

Achieving the optimal level of motor coordination increases the possibilities of improving technical-tactical capability of boxers. For example, movement accuracy significantly determines the efficiency of attacks. Thus, boxers must have skills of executing single punches and combinations of punches to a precisely marked area using various pedagogical techniques that facilitate the improvement of movement accuracy (Bibikov, 2008; Carroll, Barry, Rick, & Carson, 2011; Surina-Marysheva, Malkov & Yermolaeva, 2016).

Our methods for improving basic sports training of adolescents aged 13-14 as a sports reserve have increased the technical competence indicators in experimental group boxers (Table 2).

**Table 2** Technical competence indicators of boxers, points

Technical competence indicators	Initial data ( $\bar{x} \pm S \bar{x}$ )	After experiment ( $\bar{x} \pm S \bar{x}$ )	Index growth, %
Number of mastered attacks	<u>2.81±0.17</u> 2.77±0.14	<u>3.07±0.21</u> 3.69±0.24*	<u>9.25</u> 33.21
Individual peculiarities of attacking and defensive actions	<u>2.69±0.18</u> 2.68±0.14	<u>2.88±0.19</u> 3.43±0.16*	<u>7.06</u> 27.99
Frequency of distance change	<u>2.77±0.20</u> 2.79±0.14	<u>3.04±0.14</u> 3.46±0.09*	<u>9.75</u> 24.01
Number of defensive maneuvers used	<u>2.66±0.21</u> 2.67±0.16	<u>2.92±0.12</u> 3.38±0.15*	<u>9.77</u> 26.59
Increase in movement speed by the end of the round	<u>2.56±0.21</u> 2.53±0.18	<u>2.73±0.17</u> 2.90±0.16*	<u>6.64</u> 14.62

Note: numerator is the indicators measured in the control group while the denominator is the indicators measured in the experimental group; \* is the validity at p<0.05 significance point.

In terms of all technical competence indicators, significant changes (p>0.05) were found in the experimental group versus the control group. The most significant changes were found: in the number of mastered attacks, which increased by 33.21% in experimental group and by 9.25% – in control group athletes; in the individual peculiarities of attacking and defensive actions (27.99% and 7.06%, respectively); in the number of defensive maneuvers used (26.59% and 9.77%, respectively); in the frequency of distance change (24.01% and 9.75%, respectively). The dynamics of changes in the technical competence indicators is presented in Figure 1.

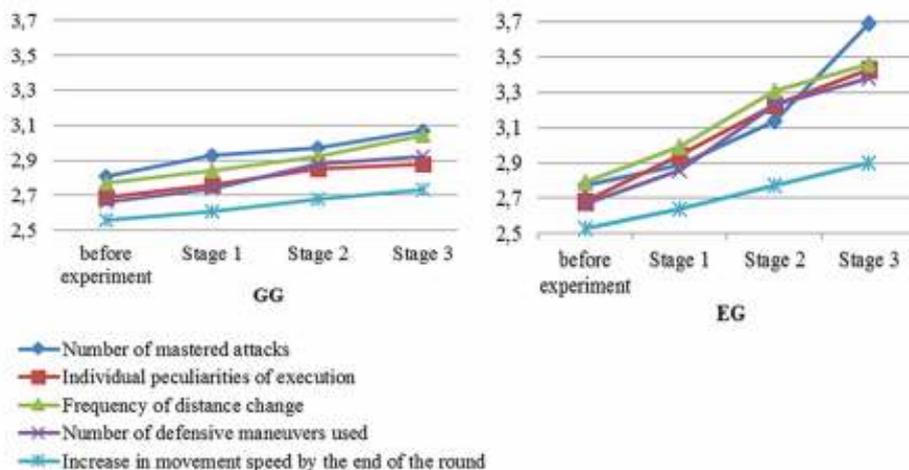


Figure 1 — Dynamics of changes in the technical competence indicators in boxers during basic training

Thus, pedagogical experiment provided data indicating that the level of physical fitness and technical competence is significantly improved by maintaining body stability in the stressful situation of a bout, being ready to control the opponent’s movement to timely determine the moment for attack and dodging the punch, developing the ability to anticipate the opponent’s actions, developing the boxer’s personality traits, accumulating and using competitive experience to improve the check motion in the ring.

**Discussion**

The conditions that were used in our method of basic boxing training are focused on developing skills of attacking and defensive actions during training and competitive activity when fighting opponents of different skills and competitive experience (Akopyan et al., 2007; Kolesnik, 2010; Wu, 2003), constitution features, anthropometric indexes, and other individual features and characteristics (El-Ashker & Nasr, 2012; Gaskov & Kuzmin, 2010; Guidetti et al., 2002; Petrov & Kolesnik, 2009). This is emphasized by many researchers and coaches that deal with problems related to training young boxers.

The program was used to develop motor characteristics (strength, endurance, agility, and coordination) as a base for further training (El-Ashker & Nasr, 2012; Guidetti et al., 2002; Khanna & Manna, 2006; Newton & Kraemer, 1994; Platonov, 2015; Qian, 2015; Smith, 2006).

The methodology, used to train young boxers at the basic stage, included the variability of loads in various conditions, including competitive ones. The efficiency of including such loads in various situations was studied by several researchers (Oskolkov, 2016; Petrov & Kolesnik, 2009; Strelnikov et al., 2011), most of whom draw attention to the complex coordination exercises (Nazarenko, 2003; Oskolkov, 2016; Qian, 2015),

which were also included in the training according to our program in order to develop skills of maintaining body balance in the stressful situations of a bout. However, besides variable situations, emphasis was also placed on developing the ability to accumulate and, most importantly, to use motor and competitive experience.

The technical-tactical training is also a crucial component of developing and improving sportsmanship of young boxers (Kulikov et al., 2011; Gaskov & Kuzmin, 2010). It is focused on the ability to analyze the opponent's activity (be ready to anticipate and control the opponent's actions) both before and during a bout.

Considerable emphasis was placed on psychological training (Demchenko et al., 2014; Shiryayev, 2002), rational motivation and interest in the sport (Guidetti et al., 2002), as well as on developing and improving moral-volitional qualities (Kolesnik, 2007, 2010). The methods was focused on preparing boxers psychologically to boxing in general and to victories and defeats in particular, on overcoming feat and other negative emotions that may have a negative effect on the training process (Guidetti et al., 2002; Kolesnik, 2007). At basic training, the coach (Khanna & Manna, 2006; Sannikov & Voropayev, 2006; Smith, 2006) and the system of pedagogical influence play a major role in developing boxer's personality and his education. At basic training of adolescents aged 13-14, the most effective way of training is to implement the following conditions for improving psychological training: creating a situation of success; improving sport results; developing attention and analytical abilities.

The method that was developed through the introduced conditions significantly reduced the time required (compared with the standard sports training program, approved by the Boxing Federation of Russia (Akopyan et al., 2007)) for physical (including explosive strength, muscular force, and endurance) and technical training (number of mastered attacks, individual peculiarities of attacking and defensive actions, frequency of distance change, and number of defensive maneuvers used) of boxers in order to improve their motor activity and performance.

Determining and considering these conditions during the organization of the training process is effective in terms of controlling boxers' motor activity (Carroll et al., 2001; Galkin, 2002; Nazarenko, 2003; Qian, 2015; Starosta, 1999), ensuring their positive psychological and emotional state (Wu, 2003), and applying a personality-oriented approach to teach adolescent (Kolesnik, 2007; Petrov & Kolesnik, 2009; Strelnikov et al., 2011). This helps to unlock boxer's kinesiological potential and to determine the latent characteristics of his organism.

## Conclusion

Boxing training should start at the age of 10-14 (during puberty), since the basic sports training of boxers should take into account the peculiarities of age development, not only basic physical, technical-tactical, intellectual, and psychological training, but not force loads. Studies have described in detail the techniques of physical and technical-tactical training of young boxers, while psychological training is considered as secondary aspect. Constant improving and complicating boxing techniques necessitate a constant search for new directions in improving the content of the training process.

Our method emphasizes an all-round development of physical, tactical, and psychological training. At the basic stage, physical and tactical training was improved by developing: skills of maintaining body stability; the ability to anticipate and control the opponent's moves; the ability to accumulate and use the training/competitive experience to improve the control over one's own motions in the ring, etc. The conditions for improving basic training of adolescents aged 13-14 are as follows: creating a situation of success; improving sport results; developing and improving perception, attention, analytical abilities; improving reaction speed; developing skills of detecting peculiarities of fighting in the ring. In addition, special attention was paid to personal psychological and pedagogical approach to adolescents.

Our method for improving basic sports training of 13-14-year-old boxers has significantly increased the level of physical (strength, explosive strength, and endurance) and technical (all indicators) training of combatants.

Since our concept of sports reserve training proved to be effective in terms of improving physical and tactical training of boxers during basic sports training, we recommend coaches to use it with novice 13-14-year-old boxers. Our method can supplement existing training programs for young boxers due to the methodology of pedagogical and psychological approach to education during basic training. It is also necessary to study the effect of this method on the psychological training of young athletes.

## References

- Akopyan, A.O., Kalmykov, E.V., Kurguzov, V.A., Pankov, V.A., Rodionov, A.V., & Cherkasov, A.S. (2007). *Boxing: Tentative Program of Sports Training for Sports Schools and Specialized Children and Youth Sports Schools of the Olympic Reserve* (2nd ed.). Moscow. Soviet sports.
- Atilov, A.A. (2005). *The School of Boxing for Beginners*. Rostov-on-Don. Phoenix.
- Baranov, D.V. (2004). *The Effectiveness of Using Lead-Up Exercises while Perfecting Boxers' Technical-Tactical Mastery: an abstract of PhD in Pedagogy dissertation*. Tula. Francisk Skorina Gomel State University.
- Baranov, V.P., & Baranov, D.V. (2008). *Modern Sports Training of Boxers*. Practical Guide (1st V.). Gomel. Sozh.
- Bastian, M. (1998). *Arbeitsbericht zur Wettkampfbeobachtung*. Leipzig: IAT.

- Bibikov, S.V. (2008). *Methods for Developing Coordination Skills in Young Boxers based on the Simulation of Competitive Conditions: an abstract of PhD in Pedagogy Dissertation*. Volgograd. Lesgaft National State University of Physical Education, Sport and Health.
- Bolotin, A., & Bakayev, V. (2017). Pedagogical conditions required to improve the speed-strength training of young football players. *Journal of Physical Education and Sport*, 17(2), 638. DOI:10.7752/jpes.2017.02095
- Carroll, F.J., Barry, B., Rick, S., & Carson, R.G. (2001). Resistance training enhances the stability of sensorimotor coordination. *Proc. Biol. Sci.*, 268(1464), 221–227.
- De Lira, C.A.B., Peixinho-Pena, L.F., Vancini, R.L., Fachina, R.J., De Almeida, A.A., Andrade, M.S., & Silva, A.C. (2013). Heart rate response during a simulated Olympic boxing match is H. Chaabe'ne et al. predominantly above ventilatory threshold 2: a cross sectional study. *Open Access J Sports Med.*, 4, 175–182.
- Demchenko, Y.V., Yatsin, Y.V., & Salmikov, V.A. (2014). The Connection of Motor Manifestations of Individual Psychological Traits in Boxers Aged 12-13 during Basic Training. *Omsk Scientific Bulletin*, 2 (126), 193–197.
- Di Russo, F., & Spinelli, D. (2010). Sport is not always healthy. Executive brain dysfunction in professional boxers. *Psychophysiology*, 47, 425–434.
- El-Ashker, S., & Nasr, M. (2012). Effect of boxing exercises on physiological and biochemical responses of Egyptian elite boxers. *J Phys Ed Sport*, 12, 111–116.
- Galkin, P.Y. (2002). *Orientation of the Boxers' Training Methods on the Development of Readiness for Choosing Fighting Tactics: an abstract of PhD in Pedagogy dissertation*. Chelyabinsk. Ural State Academy of Physical Culture.
- Gaskov, A.V., & Kuzmin, V.A. (2010). *Modeling Training-Competitive Activity in Boxing*. Monograph. Krasnoyarsk. Siberian Federal University.
- Guidetti, L., Musulin, A., & Baldari, C. (2002). Physiological factors in middleweight boxing performance. *Journal of Sports Medicine and Physical Fitness*, 42(3), 309–314.
- Kalmykov, Y.V., Kiselev, V.A., Kleshchev, V.N., & Khromov, N.D. (2009). *The Theory and Methods of Boxing. Textbook*. Moscow. Physical Culture.
- Karakukcu, C., Polat, Y., Torun, Y.A., & Pac, A.K. (2013). The Effects of Acute and Regular Exercise on Calcium, Phosphorus and Trace Elements in Young Amateur Boxers. *Clin Lab.*, 59, 557–562.
- Kawamori, N., & Haff, G.G. (2004). The optimal training load for the development of muscular power. *J Strength Cond Res.*, 18(3), 675–684.
- Khanna, G.L., & Manna, I. (2006). Study of physiological profile of Indian boxers. *J Sports Sci Med.*, 5, 90–98.
- Khokhla, A., & Pavlos, O. (2017). Effectiveness of a complex physical training program of fencers during the preliminary-basic work phase. *Journal of Physical Education and Sport*, 17, 142. DOI:10.7752/jpes.2017.s1022
- Kolesnik, I.S. (2007). *The Personality of a Boxer*. Moscow. “Theory and Practice of Physical Culture and Sports” Publishing Center.
- Kolesnik, I.S. (2010). *The Structure and Content of Sports Training of Boxers Aged 15-17*. Ulyanovsk. Ulyanovsk State Pedagogical University.
- Kulikov, L.M., Bolotov, V.M., Polozkov, N.F., & Rybakov, V.V. (2011). Approaches to Updating the Scientific and Methodological Support of Training Sports Reserves. *Physical Culture: Upbringing, Education, Workout*, 3, 34–39.
- Lenetsky, S., Harris, N., & Brughelli, M. (2013). Assessment and contributors of punching forces in combat sports athletes: implications for strength and conditioning. *Strength Cond J*, 35(2), 1–7.
- McCroory, P. (2008). *Neurologic Problems in Sport, in Olympic Textbook of Medicine in Sport*. Oxford, UK. Wiley-Blackwell.
- Nazarenko, L.D. (2003). *Means and Methods of Developing Movement Coordination*. Monograph. Moscow. Theory and Practice of Physical Culture.
- Newton, R.U., & Kraemer, W.J. (1994). Developing explosive muscular power: implications for a mixed methods training strategy. *Strength Cond J.*, 16(5), 20–31.
- Oskolkov, V.A. (2016). The Method of Strictly Regulated Exercises in the Training of Young Boxers and Mistakes in its Use. *International Scientific Review*, 3 (13), 160–163.
- Petrov, A.G., & Kolesnik, I.S. (2009). *Formation of a Boxer's Individual Style*. Ulyanovsk. Ulyanovsk State Pedagogical University.
- Pierce, J., Reinbold, K., Lyngard, B.C., Goldman, R.J., & Pastore, C.M. (2006). Direct measurement of punch force during six professional boxing matches. *J Quant Anal Sports.*, 2(2), 1–17.
- Platonov, V.N. (2013). *Periodization in Sports Training. General Theory and Its Practical Applications*. Kiev. Olympic Literature.
- Platonov, V.N. (2015). *The System of Athlete Training in Olympic Sports. General Theory and Practical Applications*. Textbook. Kiev. Olympic Literature.

- Qian, L.Y. (2015). Experimental Substantiation of the Method for Developing Coordination Skills in Young Boxers Aged 11-13. *Pedagogy, Psychology and Medical-Biological Problems of Physical Education and Sports*, 6, 14–22.
- Roberts, R. & Smith, A.R.M. (2014). *Boxing, in A Companion to American Sport History*. Oxford, UK. John Wiley & Sons.
- Ruiz-Montero, P. J., & Chiva-Bartoll, Ó. (2017). Evolution of the ageing process, quality of life and physical fitness in western countries. *Journal of Physical Education and Sport*, 17, 97. DOI:10.7752/jpes.2017.s1015
- Sadowski, J. (1998). Studies of selected elements of movement coordination in taekwondo athletes. *Rokz. Nauk.*, 5, 37–40.
- Sannikov, V.A., & Voropayev, V.V. (2006). *Theoretical and Methodological Framework of Boxer Training*: Guide. Moscow. Physical Culture.
- Shchitov, V.K. (2007). *Basic Sports Techniques*. Rostov-on-Don. Phoenix.
- Shiryaev, A.G. (2002). *Boxing. To the Teacher and the Pupil* (2nd. ed.). Saint Petersburg. “SHATON” Publishing House.
- Shulika, Y.A. (2009). *Boxing. Theory and Methods*. Moscow. Soviet Sport Publishing House.
- Smith, M. (2006). Physiological profile of senior and junior England international amateur boxer. *J Sports Sci Med.*, 5, 74–89.
- Starosta, W. (1999). *Interdependence between physical and coordination abilities – selected problems and their implications in the practice of physical education and sport training*. Proceedings I of the 6-th Sport Kinetics Conference'99. Ljubljana, 3–13.
- Strelnikov, V.A., Durinov, A.Y., & Dashiev, A.B. (2011). Individual Approach of the Coach to the Mastery of Competitive Techniques by Student Boxers by the Example of Bout Situations with Varying Distance. *Belarusian State University Journal*, 13, 140–144.
- Surina-Marysheva, E.F., Malkov, V.P., & Yermolaeva, E.N. (2016). Sensomotor integration features in skilled female boxers. *Journal of Physical Education and Sport*, 16(1), 24. DOI:10.7752/jpes.2016.01004
- Unterharnscheidt, F. (2003). *Boxing medical aspects*. Amsterdam. Acad.Press.
- Wu, D.T. (2003). *Connected Development of Physical and Psychomotor Characteristics of Young Boxers Aged 15-16: an abstract of PhD in Pedagogy dissertation*. Moscow.