



FORMATION OF MOTOR SKILLS IN ATHLETES IN BULLET SHOOTING AT THE INITIAL STAGE OF TRAINING

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Abstract

The purpose of the study – to describe the peculiarities of the formation of motor skills in athletes in bullet shooting at the initial stage of training.

Materials and methods. The following research methods were used to solve the tasks: analysis and generalization of scientific and methodological literature, pedagogical observations, processing of results. The analysis of the scientific and methodological literature made it possible to establish that in the technical training of young shooters the available general information is given without specifying the use of tools and methods for learning motor skills. The pedagogical observation was used to study the peculiarities of learning the technique of performing bullet shooting elements, as well as mastering motor skills.

Results. The analysis of educational and training activities allowed to determine that learning to master the technical elements of shooting athletes at the stage of initial training requires the use of modern methods and tools. A number of educational and methodological documents were analyzed: the curriculum for the training of archery for children and youth sports schools, specialized children and youth schools of the Olympic reserve, schools of higher sportsmanship and educational institutions of sports profile; specialized literature on shooter training. In the process of analysis it was determined that the technical training of athletes occupies a significant share of the duration of the training process, and requires the use of an increased arsenal of additional tools for the effective study of shooting techniques.

Conclusions. A detailed analysis of the specialized educational and methodological literature for the training of shooters revealed that in the group of initial training technical training is characterized by studying the basics of elements of shooting techniques, namely: racks for shooting, aiming, breathing, finger pressure on the trigger. Mastering these basics of the elements of shooting technique directly depends on quality and well-formed motor skills, which in the future will allow the athlete to achieve a high sports result.

Keywords: bullet shooting, motor skill, technical training.

Introduction

Technical training of athletes in bullet shooting at the stage of initial training should be based on the formation of motor skills. It is appropriate to describe the features of sports training of young shooters in bullet shooting, taking into account the physiological basis of its formation, as well as the system of educational and training process. From the very beginning, technical training is one of the main priorities and reserves for improving efficiency and should be built in a way that takes into account trends in research (Lopatiev, Vlasov, & Trach, 2013; Pavlyuk, Pityn, Pavlyuk, Chopyk, Antoniuk, & Soltyk, 2020; Lopatiev, & Demichkovskiy, 2021).

The specialists proposed the basics of the method of formation of motor skills, and also made an attempt to interpret them in accordance with modern requirements of the sports industry (Vovkanych & Berhtraum, 2013; Kalynichenko & Lopatiev, 2012; Kalynichenko, 2009).

Technical training is one of the key in bullet shooting, because in the future it creates a foundation for successful performances in competitions of various levels and achieve the maximum possible individual result. Taking into account the peculiarities of the initial training of athletes and the formation of motor skills, it is important at this stage to choose effective tools and methods for the training process. It is proposed to use the basics of a systematic approach in the pedagogical process, as it allows to identify certain parts of the system “shooter – weapon – target” for further training

and improvement (Vlasov et al., 2016; Lopatiev et al., 2017; Pyanylo et al., 2020; Pyanylo et al., 2021).

The available scientific and methodological literature does not take into account the modern nature and approaches to the training of young shooters through the formation of motor skills, which are the basis of sports techniques. There are no methodological recommendations for technical training of athletes in shooting at the beginning of a sports career, which creates a mismatch between the use of tools and methods for effective training of shooters, quality formation of motor skills and scientific explanation of basic psycho-physiological mechanisms of their use (Kalynichenko & Lopatiev, 2012; Mon-López & Tejero-González, 2019; Mon-López et al., 2021; Park et al., 2019).

On the issue of training young athletes in shot put at the stage of initial training, it is emphasized that the study and mastering of sports techniques and its elements will be the foundation for further sports training (Volkov, Kuksa, Dronov, Starinskyi, Bohino, & Petrosiuk, 2009; Gładyszewski & Gładyszewska, 2012).

At present, no clear methods and steps for technical training are offered in the training of novice athletes in shot put. The main purpose of technical training at the initial stage is to master the technical elements, that is, such motor skills that will further contribute to its effective use to achieve high sports results. In order to suggest specific steps for mastering the technical elements, it is necessary to analyze the shooting technique, characterize and identify the key elements, as well as describe the physiological mechanism of motor skills formation.

The purpose of the study – to describe the peculiarities of the formation of motor skills in athletes in bullet shooting at the initial stage of training.

Materials and methods

Research participants

The study involved athletes in the bullet shooting group of primary training (male and female). It is assumed that on the basis of performance analysis it is possible to determine the level of technical readiness and informative indicators of readiness of novice shooters, that is, motor skills.

Research organization

The following research methods were used to solve the tasks: analysis and generalization of scientific and methodological literature, pedagogical observations, processing of results. The analysis of scientific and methodological literature made it possible to establish that in the technical training of young shooters available general information is given without specifying the use of tools and methods for learning motor skills. Pedagogical observation was used to study the peculiarities of learning the technique of performing bullet shooting elements, as well as mastering motor skills.

Testing procedure

Video recording of rifle shooting training by novice athletes was carried out. The results were used to identify the main mistakes that athletes made during their performance.

Equipment: video camera, analysis chart.

Results

In the specialized educational and methodical literature it is emphasized that the content of technical training of athletes in bullet shooting at the stage of initial training is: mastering the elements of shooting technique (racks for shooting, aiming, breathing, finger pressure on the trigger).

Under the technique of shooting we will understand a set of rational motor actions of the shooter, aimed at achieving a high sports result in a particular type of shooting.

The analysis of scientific and methodological documentation revealed that the curriculum of long-term training program for shooters for children and youth sports schools, specialized children and youth schools of the Olympic reserve, schools of higher sportsmanship and educational institutions of sports profile indicated: technical training at different stages of long-term training is within – the stage of initial training – 42.2% (first year), 54.9% (second year); previous basic training – 56.1% (first year), 52.4% (fourth year); specialized basic training – 53.4% (first year), 54.6% (third year); preparation for higher achievements – 57.9%

Table 1. Curriculum of long-term training, hours (Volkov, Kuksa, Dronov, Starinskyi, Bohino, & Petrosiuk, 2009)

Type of training	Group									
	Initial training		Pre-basic training			Specialized basic training			Preparation for higher achievements	
	Year of study									
	1-й	2-й	1-й	2-й	3-й	4-й	1-й	2-й	3-й	All term
Theoretical training	20	20	20	24	24	28	38	38	34	34
General physical training	80	90	110	130	154	162	166	168	170	174
Special physical training	36	48	92	120	140	160	190	192	194	196
Technical training	136	202	310	334	444	482	590	652	704	852
Participation in competitions, drawing up standards	4	8	20	36	56	72	100	120	150	180
Instructing and judging practice	–	–	–	–	10	16	20	24	36	36
Total:	276	368	552	644	828	920	1104	1194	1288	1472

of the total amount (Table 1). Thus, it is possible to indicate that the technical training of the shooter is an important factor in successful performance in competitions, appropriately selected tools and methods at the initial stage of training will contribute to achieving high sports results in the future.

Hereinafter, we use the following terminology.

Under the movement we will understand any movement in the body, as well as changes in its state.

Change – the transformation of something into something qualitatively different, change is characterized by the direction, speed and duration. Change is also understood as the transition from one place to another (spatial movements).

Mechanical movements are changes in the position of a body (material point) over time relative to other bodies.

Biokinematics is a branch of biomechanics that studies the motion of living bodies and biological systems. In general, kinematics is a branch of mechanics that studies the external laws of motion of a material point.

Dynamics is the doctrine of the motion of bodies under the influence of forces. The task of dynamics – to determine the movement of the body by the specified forces that affect it and vice versa – to determine the forces that cause its movement by the specified direction of movement of the body. Dynamics as a branch of mechanics studies the mechanical causes of motion.

Biodynamics – a branch of dynamics that studies the action of forces that provide movement to the human body.

Motor action is a manifestation of human motor activity, which is aware of it and is aimed at solving any specific motor task.

Motor actions consist of innate (based on unconditional) and acquired during life (based on conditioned reflexes). The innate motor actions play a secondary role, remaining in the form of tendon, protective and vestibular reflexes throughout human life. Complex motor actions are formed in the process of life as a result of learning and are based on the formation of complex conditioned reflexes. The physiological mechanism for the formation of new, individually acquired types of motor activity are temporary connections, that are formed on the principle of conditioned reflexes. The ability to develop new motor skills, that is, the ability to train, is largely due to hereditary factors, and is different in different people, the rate of formation of new motor skills changes with age.

Motor action is the smallest structural unit of ball shooting technique (technique, motor action, motor skill, temporal connections). This division provides an opportunity to effectively analyze and select tools and methods for teaching shooting techniques to young shooters at the initial stage of training, which in turn will help to improve the effectiveness of the process of sports training at the beginning of a sports career.

In shooting we are interested in the result, so it is logical to study the material and information system “shooter – the result”, in which the material component of the system is replaced by an information component in shooting sports.

In systemology study the dynamic system consisting of three subsystem elements: “object – interaction – environment”, where the object – stable in time and limited in space formation, perceived as a whole – an element of the system; interaction – continuous process of interconnected with causal relationships transformation of the parameters of the object and the environment; environment – an arbitrary

set of objects that may affect the studied object (Fig. 1). The material system “shooter – weapon – target” was identified to determine the influence of external and internal factors on the functioning of this system, which later allowed to divide the execution of the shot into phases: “aiming”, “execution of the shot – active shot”, “shot adjustment” (Demichkovskiy, 2019; Lopatiev, & Demichkovskiy, 2021).

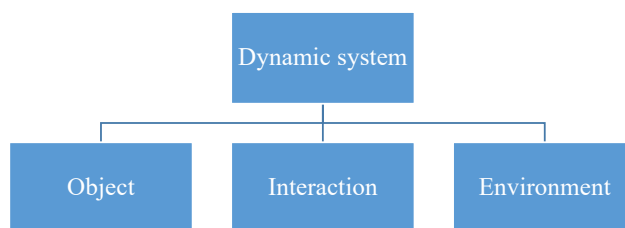


Fig. 1. The dynamic system of “object – interaction – environment” (Demichkovskiy, Lopatiev, & Pianylo, 2021)

Using this principle to build a system, we propose to create a system “shooter – weapon – result” to further establish the relationship between the result and the phases of the shot.

The feature of the information system “shooter – result” is the analysis of the element “result” (see Table 2) and establishing a connection between the elements of the system. The result of the shooting characterizes the level of training of the athlete, the analysis of which will improve the selection of tools and methods for training.

A feature of systems analysis is the use of two types of methods: qualitative and formal.

In shooting sports for analysis often use:

- discriminant analysis – a type of multidimensional analysis designed to solve problems of image recognition. Used to decide which variables share (i.e. discriminate) certain data sets (so-called groups);
- regression analysis is needed to solve problems in which stochastic dependencies (stochastic cause-and-effect relationships) are given by functions with one or more variables that are defined as independent. Regression analysis is a method of mathematical statistics that allows to determine the degree of separate and combined influence of the factors being studied on the performance trait and to quantify this influence using different criteria;
- correlation analysis is used to determine the relationship between two or more stochastic variables that exist between them.

Table 2 is directly related to the effectiveness of mastering the motor skills of shooters in ball shooting, because it provides an opportunity to analyze the result of the performance, that is the level of mastery of technical training.

Discussion

The attempt to describe the peculiarities of the formation of motor skills in athletes in shot put at the stage of initial training was made in the paper.

Considering technical training as a process of formation of motor skills, a number of authors drew attention and defined it as follows: technical training is a process of mastering

Table 2. Analysis of air rifle shooting

Steps of analysis	Description	Organizational and methodological guidelines
The first – the analysis of the result	Investigate the outcome of the competitive exercise in general.	—
The second – the analysis of series	The analysis of each series provides information about the course of fatigue during the shooting. In each series, it is manifested by a decrease in performance, for example, the first series – 97 points; second series – 96 points; third series – 98 points; fourth series – 96 points; fifth series – 98 points; sixth series – 96 points. The results of the series differ from the maximum of 100 points	Analyzing the result of the series within the exercise, we can attest that fatigue is manifested in the athlete in the lowest results in the series
The third – a shot analysis	Each shot of the competitive activity is studied in each series and analyzed from 1-10, 11-20, 21-30, 31-40, 41-50, 51-60 so that you can observe the location of each shot according to the center of the target, for example : T.L. (top left); T.R. (top right); D.L. (down left); D.R. (down right). Most attention is paid to those series with the lowest result to determine at what point fatigue affected the athlete and reflected in the result. Determine the percentage ratio between the total number of shots in the exercise and determined, according to their location relative to the center of the target	Demonstrates in which direction in accordance with the center of the target is the deviation of the shots, the presence of which is a consequence of the lack of appropriate technical and tactical adjustments during the exercise, as well as the impact of fatigue on the athlete. The results are important for practical work, because they allow to make appropriate changes in the implementation of the exercise
The fourth – the generalization of the obtained results	Distribute all the shots according to the execution from the first to the last, make a table, build a visual schedule of execution, on which it is possible to clearly see how each shot and exercise in general took place. The schedule will allow you to see the picture of performance, will show the coach the level of preparedness of the athlete	The analysis should be carried out individually for each athlete to determine ways to improve the training of each athlete and choose the right tools and methods to perform tasks

the technique of shooting and improving technical skills (Vynohradskyi & Demichkovskiy, 2021, 2022). This statement is best related to the initial preparation stage, because in the following stages the statement is supplemented by additional information load, and is interpreted as follows: technical training is the improvement of sports equipment by changing the dynamic and kinematic parameters of the structure of movements during the shot taking into account the individual characteristics of the athlete, compliance with modern conditions of competitive activities and morpho-functional capabilities of the athlete during the shot during competitive exercises, ensuring the resistance of technology to the action of disruptive factors (Lopatiev & Demichkovskiy, 2021).

An important role in the formation of motor skills belongs to the coordination of movements. Such qualities of movement as smoothness, accuracy and necessary force are realized by physiological mechanisms of an athlete's organism by regulation of temporal, speed and spatial characteristics of movement.

The hypothesis put forward by Kalynichenko and Lopatiev (2012) that in the final phase of the shot it is necessary to use control mechanisms such as "aimless movement" and avoid control mechanisms "target movements" requires theoretical confirmation of the formation of motor skills in shooting as a basis for performing an accurate shot from a physiological point of view. Attention is drawn to the fact that the concept of purposeful change, pedagogical means of controlling the motor actions of athletes in the final phase of the shot is possible, and opens encouraging prospects for improving the efficiency and intensification of shooters training using modern methods of analysis of technical readiness

of shooters (for example, table 2). Due to this, not only the methodology can change, but also the specific technology of forming the given systems of movements of athletes in shooting sports in the process of learning and training.

Conclusions

The paper describes the mechanism of formation of motor skills of young athletes in bullet shooting at the stage of initial preparation. Emphasis is placed on the importance of using modern methods and means of technical training, which directly affect the formation of motor skills, that is create a quality basis for the formation of temporary connections and effective mastery of shooting techniques. A detailed analysis of the specialized educational and methodological literature for the training of shooters revealed that in the group of initial training technical training is characterized by studying the basics of elements of shooting techniques, namely: racks for shooting, aiming, breathing, finger pressure on the trigger. Mastering these basics of the elements of shooting technique directly depends on high-quality and well-formed motor skills, which in the future will allow the athlete to achieve high sports results.

Conflict of interest

The authors declare no conflict of interest.

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ФОРМУВАННЯ РУХОВИХ НАВИЧОК У СПОРТСМЕНІВ В СТРІЛЬБІ КУЛЬОВІЙ НА ЕТАПІ ПОЧАТКОВОЇ ПІДГОТОВКИ

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Авторський вклад: А – дизайн дослідження; В – збір даних; С – статаналіз; D – підготовка рукопису; Е – збір коштів
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Мета дослідження – описати особливості формування рухових навичок у спортсменів зі стрільби кульової на етапі початкової підготовки.

Матеріали та методи. Для вирішення поставлених завдань було використано наступні методи дослідження: аналіз та узагальнення науково-методичної літератури, педагогічні спостереження, обробка результатів. Аналіз науково-методичної літератури дав змогу встановити, що в технічній підготовці юних стрільців наявна загальна інформація подана без конкре-

тизації використання засобів та методів для формування рухових навичок. Педагогічне спостереження використано для вивчення особливостей навчання техніки виконання елементів стрільби кульової, а також оволодіння рухових навичок.

Результати. Аналіз навчально-тренувальної діяльності дозволив визначити, що навчання технічних елементів стрільби спортсменів на етапі початкової підготовки потребує використання сучасних методів та засобів. Було проаналізовано ряд навчально-методичних документів: навчальна програма з підготовки стрільців з кульової стрільби для дитячо-юнацьких спортивних шкіл, спеціалізованих дитячо-юнацьких шкіл олімпійського резерву, шкіл вищої спортивної майстерності та навчальних закладів спортивного профілю; спеціалізована література з підготовки стрільців. У процесі аналізу визначено, що технічна підготовка спортсменів займає вагомую частку тривалості навчально-тренувального процесу, і вимагає застосування збільшеного арсеналу додаткових засобів для ефективного навчання техніки стрільби.

Висновки. Детальний аналіз спеціалізованої навчально-методичної літератури для підготовки стрільців дозволив встановити, що в групі початкової підготовки технічна підготовка характеризується вивченням основ елементів техніки стрільби а саме: стійки для стрільби, прицілювання, дихання, натискання пальцем на спусковий гачок. Саме оволодіння цих основних елементів техніки стрільби напряму залежить від якісних та правильних сформованих рухових навичок, що в майбутньому дозволить спортсменові досягнути високого спортивного результату.

Ключові слова: стрільба кульова, рухова навичка, технічна підготовка.

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