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**INDO AMERICAN JOURNAL OF
PHARMACEUTICAL SCIENCES**<http://doi.org/10.5281/zenodo.1304338>Available online at: <http://www.iajps.com>**Research Article****BASIC TRAINING IN SHOOTING BASED ON THE
NEURODYNAMIC CHARACTERISTICS OF ATHLETES****Larisa A. Kadutskaya***, Ekaterina S. Nikolaeva, Ekaterina Yu. Domrachyova ,
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Abstract:

A dramatic rise in athletic and technical achievements is typical for contemporary high-performance sports. This trend can be observed in all kinds of sports, including rifle and pistol shooting, which is a precision sport. Though this event is not among active sports, it does not mean any relaxation in the physical fitness level requirements. Today rifle and pistol shooting involves significant exertion. The article deals with the issues of basic training in shooting and individual approach applied in training shooters within a representative pistol team.

Key words: shooter, SCATT, training, coordination, pistol, training system, skills, methods, coach.

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INTRODUCTION:

The individual approach in training shooters, which is not used in full at present, may enhance the athlete's performance in the future.

This issue may be considered as underexplored. According to H.A. Edgerton, individual-specific approach can pave the way for new prospects in athletic training.

The individual-specific training implies the organization of the training and educational process which takes into account individual characteristics of the trainees (including physiological, morphological and psychical ones) aimed at a maximum development of strengths and acquiring knowledge and skills [1].

The need to apply the individual-specific approach, in the first place, is dictated by different levels of proficiency in athletes.

Purpose of Research.

A major aspect of the individual-specific approach is the inclusion of individual characteristics in the skill-building process.

Methods.

The specifics of the development of mental processes in individuals must be taken into consideration during the process of skill-building and presentation of educational materials, as the rate of skill-building depends on the neurodynamic characteristics of individuals. A distributed learning is recommended for athletes with a weak nervous system, while concentrated training is preferable for those with a strong one.

Research by V.D. Nebylitsyn proves that there is a statistical dependence between the strength of a nervous system and its sensitivity: the higher the strength, the lower the sensitivity, and vice versa.

The strength and sensitivity of the nervous system are thought of as two dialectic aspects of a certain common parameter of the nervous system: its reactivity, which is responsible for the function of responding to certain stimulus intensity. Reflexes are formed faster and easier in individuals with a weak nervous system. This type of nervous system may be seen as "delicate psyche". Experiments have shown that such athletes are better at monotonous activities which require a high degree of sensitivity. Individuals with a strong nervous system are better suited to situations which require high-powered work and may result in stress [2].

At the same time, E.P. Ilyin stresses that the rate of skill-building depends significantly on the inertness and motility of excitation and inhibition processes.

At the first stages of training, athletes with a high motility of nervous processes show better performance than those with inert nervous processes. However, later the inert athletes catch up with the former, and their skill quality becomes identical [3]. Let us examine the case of representative pistol team illustrating the individual-specific basic training in shooting.

It is important to form precision shooting skills promptly, as the training process is time-restricted. To enhance the efficiency of the training process, we suggest applying methods of forming basic shooting skills, taking into account the neurodynamic characteristics of athletes[4].

The research subject includes the typological characteristics of the nervous system properties and their manifestation in the process of pistol training.

The goal of the research is to provide evidence of the efficiency of the training process incorporating regular exercise based on the methods suggested, taking into account the typological specifics of the manifestation of the properties of the nervous systems in athletes.

The research objectives include:

Studying the indices of inertness and motility of the nervous processes and their impact on the shooting performance.

Approbation of the methods of basic training in shooting taking into account the neurodynamic characteristics of athletes with a view to enhance the level of athletic training in a representative team.

Three types of testing have been used in this research:

Identifying the motility and inertness of nervous processes using the Strelau questionnaire.

Identifying the motility and inertness of nervous processes based on E.P. Ilyin's kinematometry methods using the apparatus for systemic psychodiagnostics activation meter "Aktivatsiometr AIJ-6" [5].

Testing on SCATT shooting training system.

RESULTS AND DISCUSSION:

We suggested that the inclusion of typological characteristics of the manifestation of nervous system properties in the training process would enable to enhance the shooting performance and coordination indices in athletes.

The experiment took place at the shooting ground of Olympic Reserve Sports School No 1 and lasted for 4 months.

28 testees were divided in two groups: the reference group and the experimental group. During the experiment and based on test results, the testees in both groups were divided into “inert ones” and “motile ones”, 7 persons in each group. The experimental group had a regular training according to the methods we suggest, while the reference group exercised according to their usual programme; both groups exercised on the SCATT shooting training system.

In the course of the experiment, junior athletes did pistol shooting exercises including 3 trial shots + 10 record shots.

Besides, all athletes performed a validation series of 10 shots on SCATT shooting training system in order to identify the coordination indices.

Table 1 shows pistol shooting performance.

Groups	Motility - inertness	experiment stages			P
		beginning	ending	Performance improvement	
Reference group	Motile athletes	75	80	5	> 0.05
	Inert athletes	70	74	4	
Experimental group	Motile athletes	74	86	12	< 0.05
	Inert athletes	69	78	9	

Upon completion of the record series of shooting, the athletes did a series on the SCATT shooting training system.

SCATT automated shooting training system is designed for blank firing that is, shooting without bullets.

The training system enables to appraise the athlete’s proficiency level. An analysis of systemic graphs of the training system enables to make the following conclusions:

The relatively horizontal coordination curve in the final stage of the shot, which takes 0.5 seconds, confirms a good level of the athlete’s physical fitness.

The analysis of the experiment enables to reveal the following trend: early in the experiment the performance level results obtained in the reference group and in the experimental group was approximately the same (the performance of the “motile” and “inert” athletes in the reference group was even slightly higher than that in the experimental group).

At the end of the experiment, the “motile” athletes in the reference group improved their performance by 5 scores, while the “inert” ones improved by 4 scores. The improvement in the performance of the reference group is not significant statistically ($P > 0.05$).

In the experimental group, the “motile” athletes show the most significant enhancement of performance. Their results were improved by 12 scores. The “inert” shooters improved their results by 9 scores. The improvement in the performance of the experimental group is statistically significant ($P < 0.05$).

The coordination curve with a slight smooth rise before the shot reveals a good level of the athlete’s physical fitness, but in this case a little deviation between the aim point and the target centre.

A curve with a rise informs the coach and the athlete of some problems at the final stage of the shot, that is, before the shoot, the pistol moves beyond the aiming area [6].

Upon completion of the series of shots on SCATT system, we made the curve graphics showing the coordination in the “motile” and “inert” athletes of the experimental group during the shot, before and after the experiment.

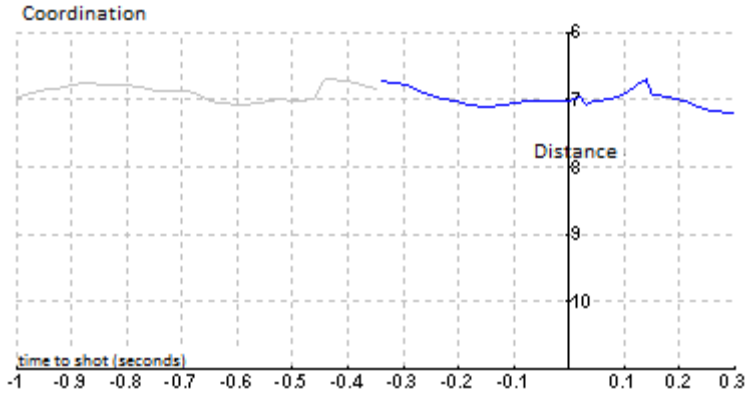


Figure 1. Experimental group with the inert nervous system before the experiment.

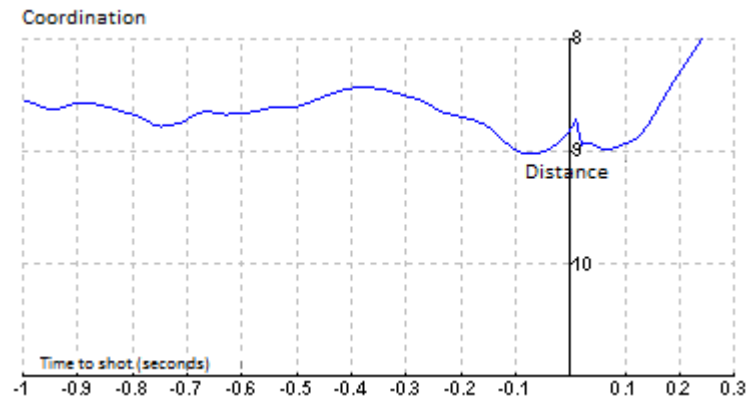


Figure 2. Experimental group with the inert nervous system after the experiment.

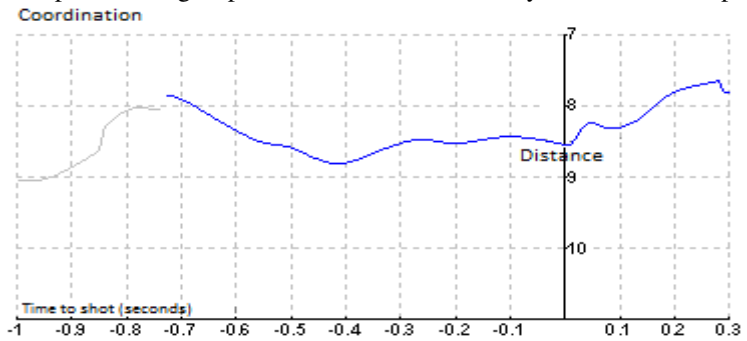


Figure 3. Experimental group with the motile nervous system before the experiment.

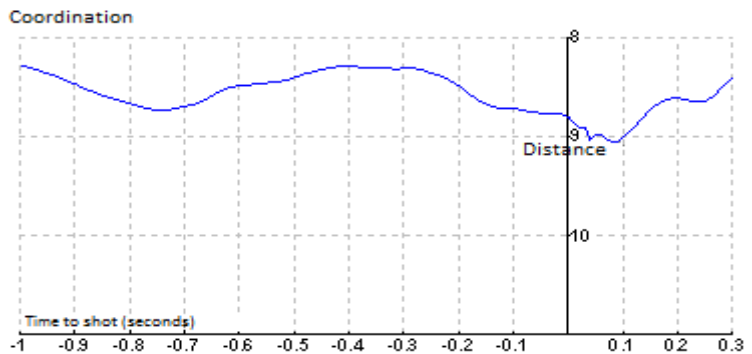


Figure 4. Experimental group with the motile nervous system after the experiment.

The analysis of the coordination curves enables to make conclusions concerning the rate of building the skill of shooting at point blank range in the “motile” and “inert” athletes within the experimental group [7]. During the experiment, the correlation between those showing a fast and a slow progress within the “motile” group was 80% to 20%, while in the “inert” group this correlation was 50% to 50% .

The reference group performance was not taken into consideration, as it is statistically invalid.

CONCLUSION:

Thus, the experimental methods of training a representative pistol shooting team, based on the typological characteristics of the manifestation of the nervous system properties, enables to accelerate the acquisition of motor skills and to enhance the efficiency of basic training in point-blank shooting, as well as to improve the coordination of actions during shooting. Besides, the analysis of the coordination curves, made with the SCATT training system, enables to eliminate the mistakes at the stage of basic training in point-blank shooting [8].

According to the data obtained, and guided by the basic principles of planning training exercises in rifle and pistol shooting, in compliance with the requirements to the organization of the training process, we have developed and adjusted the plans of weekly micro-cycles.

We also suppose that the suggested methods of basic shooting training, built upon the neurodynamic characteristics of athletes, will prove to be efficient in all rifle and pistol shooting departments of specialized sports schools.

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