



# Theoretical foundations of movement control in the process of training athletes in combat sports

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## Abstract

**Objective of the study** was to develop theoretical and methodological foundations for the formation and improvement of movement control mechanisms in the process of training athletes in combat sports.

**Results and conclusions.** It has been established that movement control mechanisms ensure the implementation of elements of dynamic posture, main and corrective control movements. To increase the effectiveness of competitive exercise techniques, it is necessary to form and improve movement control mechanisms in a certain sequence, determined by the interrelation of elements in the movement system.

Based on the relationship in the motor action of the elements of posture and control movements (main and corrective), the theoretical and methodological foundations for the formation and improvement of movement control mechanisms in the process of technical and tactical training of athletes in combat sports have been developed. An algorithm has been determined for the development of methods for the formation and improvement of movement control mechanisms in the process of training wrestlers, taking into account the technique being mastered and in relation to a specific movement situation.

**Keywords:** *technical and tactical training, movement control mechanisms, coordination abilities, combat sports.*

**Introduction.** One of the currently actively developed areas for the development of sports theory is increasing the effectiveness of teaching athletes the technique of motor actions based on the development of coordination abilities [1; 2]. It has been established that in the process of training athletes in combat sports, significant attention is paid to the development of complex (wrestlers' abilities associated with solving known motor problems) and super complex coordination abilities (athletes' abilities associated with solving unknown motor problems under conditions of spatio-temporal restrictions and associated with the factor unexpectedness and lack of time) [3]. The developed methods for developing coordination abilities are based on the targeted formation and improvement of movement control mechanisms (stabilizing, rigid, flexible and tracking (controlling)) and their relationships [3, pp. 78-90].

The biomechanical features of the construction of movements and the pedagogical aspects of such features are studied in parallel with studies of human coordination and coordination abilities. Thus, the theory of movement construction was developed V.T. Nazarov [4], who established that the internal basis of motor actions consists of posture, main and corrective (auxiliary) control movements. The researcher also established a connection between these elements, which must be taken into account at the initial stage of teaching motor action techniques: At the beginning, the first phase of motor action is formed (elements of posture are mastered, then the main control movements and their relationship with the elements of posture, and then corrective control movements and their relationship with the mastered part of the motor action). In a similar sequence, the second phase of the motor action and its relationship with the first phase are mas-



tered, etc. Developing the theory of V.T. Nazarov [4] it is established that in the process of improving the technique of physical exercises, the formation of elements of posture and control movements can be carried out within the framework of the annual cycle at any stage of preparation for the main starts of the sports season, but taking into account the patterns of development of the motor potential of athletes. Improving the connection between the elements of posture and control movements at these stages of training has the same order as at the initial stage of training [5].

A comparative analysis of the scientific provisions of the theory of coordination and coordination abilities [3] and the theory of movement construction [4] showed [5] that on their basis integral scientific provisions for the development of coordination abilities in the process of training athletes can be developed. In this regard, the study of issues related to increasing the effectiveness of technical and tactical training of wrestlers based on the development of coordination abilities and taking into account the biomechanical patterns of movement construction is relevant.

**Objective of the study** was to develop theoretical and methodological foundations for the formation and improvement of movement control mechanisms in the process of training athletes in combat sports.

**Methods and structure of the study.** The principles of the theory of functional systems by P.K. Anokhin, theories of movement construction by V.T. Nazarov, the theory of coordination and coordination abilities of V.I. Lyakh, S.D. Boychenko and others are the methodological basis of the study.

Results of the study and discussion. At the first stage of research, a connection between the mechanisms of movement control, considered within the framework of the theory of coordination abilities [3], and the internal composition of physical exercises (elements of posture and control movements) [4; 5] has been established:

1) stabilizing mechanisms ensure the implementation of posture (static posture in a constant force field while maintaining posture and balance, or dynamic posture (its elements) in a variable force field when performing dynamic exercises), i.e. they fix the links in the joints with a certain degree of efficiency and create supports for active movements when performing motor actions);

2) rigid mechanisms ensure the implementation of the main control movements, subject to the effective operation of stabilizing mechanisms;

3) flexible mechanisms ensure the implementation of corrective control movements, adapting movement parameters to the conditions of the external environment (motor situation) and the internal state of the body;

4) tracking (controlling) mechanisms ensure the receipt of urgent information about changes in the external environment, as well as about the parameters of one's own motor actions and the parameters of the activity of body components that ensure their implementation.

It has been established that the effectiveness of the interaction of stabilizing, rigid, flexible and tracking (controlling) mechanisms is determined by the interrelation of the elements of posture and control movements [4; 5].

At the second stage of research, taking as a basis the composition and structure of the process of training wrestlers in technical and tactical skills (stages of training conditioned, deliberate, deliberate impromptu and impromptu motor actions) [6], taking into account the patterns of movement construction [4; 5], the procedure for forming and improving the movement control mechanisms of wrestlers in the process of their technical and tactical training has been determined.

At the stage of learning conditioned motor actions, the formation of stabilizing, rigid and flexible mechanisms for controlling movements and their connection is carried out with the participation of tracking (controlling) mechanisms in the following sequence: the first phase of motor action («stabilizing mechanisms» – «rigid mechanisms and their connection with stabilizing mechanisms» – «flexible mechanisms and their connection with stabilizing and rigid mechanisms») – the second phase of motor action («stabilizing mechanisms and their connection with elements of the first phase» – «rigid mechanisms and their connection with stabilizing mechanisms and with elements of the first phase» – «flexible mechanisms and their connection with stabilizing and rigid mechanisms and with elements of the first phase»), etc. If the model parameters of the motor action are observed, the formation of several successive elements at the same time is allowed.

At the stages of training in deliberate and deliberate-impromptu motor actions, improvement of movement control mechanisms can be carried out within the framework of a yearly cycle at any stage of preparation for the main starts of the sports season, but taking into account the patterns of development of the



motor potential of athletes [5]. Improving the connection between movement control mechanisms at these stages of learning has the same order as at the stage of learning conditioned motor actions (see above).

At the stage of training wrestlers in impromptu motor actions, methods for developing highly complex specific and special coordination abilities are used, which is due to the need to teach the athlete, under time limits, to find optimal options for the development of unknown motor situations and to effectively solve the corresponding motor problems.

In the process of practical activity, the theoretical and methodological foundations for the formation and improvement of movement control mechanisms in the process of training athletes in combat sports are filled with practical content, taking into account the technique being mastered and in relation to a specific motor situation: 1) the phase composition of the motor action is determined; 2) the internal composition of each of the phases of motor action is established (elements of posture and control movements); 3) control movements are differentiated into main and corrective (auxiliary) movements; 4) an algorithm is being developed for the formation and improvement of movement control mechanisms at the stages of technical and tactical training of wrestlers; 5) the means and methods of technical and tactical training, the magnitude of loads and their distribution at the stages of preparation, as well as forms of control are determined.

**Conclusions.** The methods for developing coordination abilities in wrestlers are based on the targeted formation and improvement of movement control mechanisms (stabilizing, rigid, flexible and tracking (controlling)) and their connection. It has been established that movement control mechanisms ensure the implementation of elements of dynamic posture, main and corrective control movements. To increase the effectiveness of competitive exercise techniques, it is necessary to form and improve movement control

mechanisms in a certain sequence, determined by the interrelation of elements in the movement system.

Based on the connection in the motor action of the elements of posture and control movements (main and corrective), the theoretical and methodological foundations for the formation and improvement of movement control mechanisms in the process of technical and tactical training of athletes in combat sports have been developed. An algorithm has been determined for the development of methods for the formation and improvement of movement control mechanisms in the process of training wrestlers, taking into account the technique being mastered and in relation to a specific movement situation.

### References

1. Boychenko S.D., Belsky I.V. Klassicheskaya teoriya fizicheskoy kultury - Vvedeniye. Metodologiya. Sledstviya. Minsk: Lazurak publ., 2002. 312 p.
2. Lyakh V.I. Koordinatsionnyye sposobnosti: diagnostika i razvitiye. Moscow: TVT Divizion publ., 2006. 290 p.
3. Nazarov V.T. Dvizheniya sportsmena [. Minsk: Polymya publ., 1984. 176 p.
4. Novakovsky S.V., Maksimovich V.A., Rudenik V.V. Obucheniye bortsov tekhniko-takticheskim deystviyam. Teoriya i praktika fizicheskoy kultury. 2022. No. 2. pp. 17-19.
5. Rudenik V.V. Razvitiye koordinatsionnykh sposobnostey na osnove vzaimosvyazey mekhanizmov upravleniya dvizheniyami. Grodnenskiy gosudarstvennyy universitet im. Yanki Kupaly. Seriya 3. Filalogiya. Pedagogika. Psikhologiya. 2015. No. 2 (195). pp. 75-83.
6. Eider E., Rudenik V.V., Boychenko S.D. Obucheniye dvizheniyu. Baranovichi: RUPP «Baranovichskaya ukрупnennaya tipografiya» publ., 2003. 291 p.