

Development of coordination abilities of fencers aged 10-12 years living in the territory of martial law

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Abstract

Background and Study Aim Success in sports activities is determined by various criteria, among which the level of development of coordination abilities stands out. The initial stage of training young athletes is important for the development of coordination abilities. At the same time, the martial law in the territory of residence of the athletes entails the need to ensure the safety conditions of life. Forced relocation of young athletes to safer places of residence presents coaches and parents with other training conditions. The purpose of the research is to identify opportunities for the development of special coordination abilities of young fencers aged 10-12 years in crisis situations caused by martial law.

Material and Methods Young fencers (n=16, age – 10-12 years, Kharkiv, Ukraine) took part in the study. The participants were divided into 2 groups – the experimental group (EG, n=8) and the control group (CG, n=8). The selection of groups took place depending on the possibility of compact accommodation of at least 8 athletes in one place and the possibility of training. The groups studied three times a week for 3 hours. The control group studied according to the standard program of the fencing department of the sports school. The experimental group studied according to the author's program. The study lasted 6 months. Parents gave their consent for their children to participate in the experiment.

Results The extremely difficult conditions of conducting the research had a significant impact on the result. The effectiveness of the developed program for improving the level of coordination abilities of 10-12-year-old fencers has been proven. At the end of the study, positive changes occurred in both groups.

Conclusions It is recommended to use video media of communication to correct plans for preparing and performing tests. The focus of the training program for athletes should be focused on increasing the amount of load that can be performed at home. Ensuring safety conditions for young athletes and coaches is a mandatory condition for training.

Keywords: Kharkiv, Ukraine, military position, fencing, coordination, basic preparation, training

Introduction

The martial law in the territory of residence of young athletes entails the need to ensure appropriate conditions for life safety. To this it should be added that the forced movement of young athletes to safer places of residence puts other conditions for training in front of coaches and parents. This restriction of the freedoms of young athletes encourages coaches to look for other areas of training. Such statements are typical in a territory in which residents find themselves under martial law and the partial effect of the restrictions of the COVID-19 pandemic.

The organization of training of young athletes in conditions of limited freedoms under martial law determines the fulfillment of quite specific requirements that are related to health safety. In the study by Staurowsky et al. [1] reflects fears about the future of sport, the prospects for athletes, and the

safety of women in sport under enforced restrictive security measures. The authors assessed the real and perceived threats and express positive thoughts about the possibilities of women's sports in the future. Abbey et al. [2] studied the prevalence of food insecurity among student athletes and the impact of the COVID-19 pandemic on these groups. The authors recommend that colleges and universities invest in food safety and athlete health activities on their campuses. Ogasawara et al. [3] studied practical training strategies for athletes to reduce the risk of infection during a pandemic. The authors expect their report to provide coaches, instructors, and policy makers from sports federations with informed decisions to create a targeted, infection-free sports and training environment.

In general, restrictions on freedoms during the COVID-19 pandemic are largely related to the safety of athletes. Such measures are also characteristic of the martial law in which young athletes find themselves. To this should be added

the forced movement of athletes to safer areas for life. Under such conditions, the main provisions for the development of coordination abilities require changes in the plans for the preparation of athletes.

The development of coordination abilities in conditions of restrictions force coaches to completely or partially switch to individual training of young athletes. This opinion is shared by Michaelsen and Cleland [4]. The authors recommend an individual approach to improve the kinematic characteristics of the athlete's movement. Waziret al. [5] determined that anthropometric, physical indicators and physical activity affect the coordination of young fencers. An important criterion is also the reaction time [6]. All this forms the methodological basis for the development of coordination abilities that help to improve the accuracy of hitting by a beginner swordsman on rapiers [7]. Witkowski et al. [8] to determine the relationship between the ability to maintain accuracy and control of movements and the amount of exercise and fatigue in fencing. The study showed similar physiological responses of the body to increased fatigue in both highly and less experienced athletes.

Thus, under the conditions of restrictions on freedoms (martial law), the main aspects of the methodology for the development of coordination abilities are preserved. At the same time, the authors point out the need to use individual training, taking into account the safety of movement and life.

The purpose of the study is to identify the opportunities for developing special coordination abilities of young fencers aged 10-12 years in crisis situations caused by martial law.

Material and methods

Participants

The study involved young fencers (n=16, age 10-12 years). The average age of young sportsmen in the groups was: in the EG – 11.25±0.7 years; in CG, 11±0.75 years; p=0.28. Participants were divided into 2 groups – experimental group (EG, n=8) and control group (CG, n=8). The recruitment of groups took place depending on the possibilities of compact living in one place and the possibility of training. The groups practiced 3 times a week for 3 hours. The control group was trained according to the standard program of the fencing department of the sports school [9]. The experimental group was engaged according to the author's program [10]. The study lasted 6 months. Parents gave their consent for their children to participate in the experiment.

Research design

At the first stage of the study, all athletes were engaged in the territory of one sports complex. Testing was done face-to-face. Martial law (Kharkiv, Ukraine) forced most of the participants to move to safer places of residence. Coaches facilitated the

movement of groups of athletes to compact places of residence. This allowed to continue training. Trainings were held together with other groups that permanently resided in the area.

The author's program for the development of coordination abilities of young fencers takes into account the conditions of restriction of freedoms [10]. It also provides opportunities for individual training of athletes. The program for EG [10] is designed for two microcycles, repeated twice consecutively in a mesocycle. The selected microcycle has three workouts per week aimed at developing coordination abilities. Attention was paid to the development of coordination in the following types of training: Tuesday – in general physical training; Thursday – in special physical training; Saturday - game preparation.

The coordination abilities of young fencers were determined using tests:

Test 1. Jump rope (<https://youtube.com/shorts/r6-W-Z-uEdc>). The maximum number of times in 1 minute;

Test 2. Jumping in place (<https://youtube.com/shorts/qmo4Z7WgKbA>). Starting position (S.p.) – legs together, arms down. Jumps are performed in the following sequence: 1) legs together→legs apart; 2) Jumps of the first position are supplemented by the sequence of the following movements (the first cycle of movements): right hand on the belt→left hand on the belt→right hand to the shoulder→left hand to the shoulder→right hand up→left hand up→right hand to the shoulder→left hand to shoulder→right hand on waist→left hand on waist. The number of cycles in 1 minute is estimated.

Test 3. The number of hits on the target in a circle with a diameter of 10 cm (https://youtube.com/shorts/2N-qg4_h42I?feature=share). The distance is far. It is performed in the following sequence: step forward→lunge with a thrust→return to the distance→jump forward→lunge with a thrust→return. The number of hits in the circle in 1 minute is estimated.

Test 4. Maneuvering on the fencing track (<https://youtu.be/fVqjSGCEwAs>). The exercise is performed in the following sequence: 2 steps forward → 1 step back (to the end of the track) →then 2 steps back → 1 step forward. The number of meters in 1 minute is estimated.

Statistical analysis

The Excel program was used. Indicators $X \pm \sigma$ were determined ($p < 0.5$).

Results

The difference between the test scores in the groups was: test 1 - "Jump rope" - 0.42; test 2 -

Table 1. Dynamics of indicators of coordination training in the CG and EG under the influence of the prepared program

Test	March 2022			October 2022				
	$X \pm \sigma$		P_1	$X \pm \sigma$			P_2	
	CG (n=8)	EG (n=8)		CG (n=8)	EG (n=8)			
Test 1., numbers per 1 min.	61.25±2.8	60.75±4	0.42	>0.1	63.25±2.5	67±2.5	0.03	<0.05
Test 2., numbers per 1 min.	3.63±0.87	3.5±1.25	0.4	>0.1	4.5±0.62	5.875±1.1	0.02	<0.05
Test 3., numbers per 1 min.	20.25±1.25	20.6±1.8	0.3	>0.1	20.37±0.7	23.37±1.7	0.01	<0.05
Test 4., numbers per 1 min.	30.19±1.44	30.84±1.21	0.23	>0.1	30.75±1.75	33.19±1.1	0.011	<0.05

“Changes in the position of the hands” - 0.4; test 3 - “Hit the target” - 0.3; test 4 - “Maneuvering on the track” - 0.23. At the beginning of the study, no significant difference was found between the groups, $p > 0.1$.

Repeated testing of the level of coordination readiness was carried out both offline and online. Under the influence of training programs, significant changes occurred in all indicators of athletes in both groups, which is clearly shown in Table 1.

There are positive changes in the groups and a significant difference between the indicators of the groups in all tests. This is explained by the fact that the athletes were in constant contact with their coaches and tried to show maximum results in new sports teams. Also, a significant decrease in the standard deviation of the athletes from the EG in the tests of general coordination readiness is noticeable. This indicates a gradual leveling of performance between stronger and weaker athletes. In the dynamics of the growth of the results of the EG in relation to the CG, they indicate the advantage of the author’s program $p < 0.05$.

Discussion

These results represent the first direct demonstration of the possibilities of organizing the training of young athletes under martial law (Kharkiv, Ukraine) and taking into account the safety of their life. The results of this study provide supporting evidence that for 10-12 year old fencers it is most appropriate to focus on the development of coordination abilities. This model of results corresponds to the previous literature [8, 9, 10, 11], which states that the age of 10-12 years is a sensitive period for the development of coordination abilities,

gaining experience and understanding the meaning of fencing activity. We fully agree with the opinion of other authors [5, 6, 7] that the emphasis on the use of coordination exercises increases the accuracy of injections (strikes) and improves the technique of fencing movements.

Other studies [12, 13, 14, 15] confirm that the use of specially selected exercises can significantly improve the balance of the body of young athletes. High levels of body balance allow athletes to have a significant advantage over their peers in the speed of performing some complex coordinations. Uzun et al. [16] recommend the use of high-intensity jumping, line exercises, and stair training for speed, agility and coordination. We believe that these recommendations are well suited for training athletes in difficult crisis situations.

While the current results clearly support the use of motor coordination exercises, it is worth recognizing several potential limitations. One of the limitations of this study is that it was not possible to select groups of athletes. This is due to the movement of athletes to safer places of residence, which is associated with martial law. Some of the limitations of this study may be addressed in future studies. For example, after the end of martial law.

Despite these limitations, these results suggest several important theoretical and practical implications. Important is the following: the use of video media communications to organize testing of young athletes; opportunities for individual training at home in safer places where athletes live. We believe that much remains to be done before a full understanding of the extent of the impact of martial law on the level of training of young athletes is established.

Conclusions

The extremely difficult conditions of the study had a significant impact on the result. Communication with the participants was established and almost

all the necessary activities were carried out. It is recommended to conduct testing online and offline in a state of war. Individual training plans include tests that the athlete can perform independently at home.

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