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CORRELATION BETWEEN TECHNICAL AND TACTICAL ACTIVITY AND PHYSICAL PREPAREDNESS OF QUALIFIED EPÉE FENCERS

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ВЗАЄМОЗВЯЗОК ТЕХНІКО-ТАКТИЧНИХ ДІЙ І ФІЗИЧНОЇ ПІДГОТОВЛЕНОСТІ КВАЛІФІКОВАНИХ ФЕХТУВАЛЬНИКІВ-ШПАЖИСТІВ. Алла ХОХЛА, Михайло ЛИНЕЦЬ. *Львівський державний університет фізичної культури*

Анотація. Ефективна реалізація техніко-тактичних дій у варіативних конфліктних умовах змагальної діяльності у фехтуванні не можлива без належного рівня фізичної підготовленості спортсменів. Мета – з'ясувати кореляційні взаємозв'язки між кількісними показниками техніко-тактичних дій та рівнем фізичної підготовленості кваліфікованих фехтувальників на шпагах.

Проведено тестування рівня фізичної підготовленості фехтувальників-шпажистів (31 спортсмен) за комплексом із 20 тестів, а також аналіз змагальної діяльності цих спортсменів за допомогою відеознімання та нотаційної фіксації основних техніко-тактичних дій (ЧЄ 17. 07. 2010 р., м. Лейпціг).

Установлено наявність значної кількості (41) статистично достовірних взаємозв'язків між показниками техніко-тактичної та фізичної підготовленості. Найбільшу кількість статистично достовірних кореляційних взаємозв'язків (34) виявлено між кистьовою, становою силою, вибуховою силою м'язів верхніх і нижніх кінцівок й спеціальною силовою витривалістю та кількісними показниками техніко-тактичних дій (ТТД), що свідчить про провідну роль силових і швидкісно-силових якостей та спеціальної витривалості. Відсутність достовірних кореляційних взаємозв'язків між кількісними показниками ТТД та рівня розвитку окремих проявів фізичних якостей (гнучкість, окремі форми прояву бистроти) може свідчити про те, що останні не лімітують ефективність змагальної діяльності кваліфікованих фехтувальників на шпагах.

Ключові слова: фехтувальники, техніка, тактика, фізична підготовленість, кореляція.

Problem setting. At this stage of high sporting achievements we can see active commercialization and professionalization. This is particularly evident in the increasing start and duration of athletes' competitive activity in the annual cycle, striving for continuation of qualified sporting career, increase of competitive entertainment activities, etc. [6, 8]. Fencing develops due to the modern tendencies in sports – systematically changing the rules of competition that cause changes in the structure and content of competitive activity. Effective implementation of technical and tactical skills in difficult conditions of competitive activity and high sporting results in fencing are not possible without a proper foundation of physical and functional preparedness of athletes. Analysis of scientific and methodical literature showed that many specialists researched the movement technique of fencers, as a condition of athletic results [1, 9 etc.] and the structure of technical and tactical activity according to the current requirements for competitive activities [2, 11]. It should be emphasized that some scientific researches deal with the study of correlations between technical and tactical skills (TTS) and physical preparedness of fencers. So, Rydnyk M. A. [7] established correlation between the technical and tactical skills and special physical preparedness for skilled foil fencers. Movshovych A. D. with co-authors [5] studied the relations between indicators of basic actions and physical and mental qualities of epée fencers aged 14-16; Ivanov I. P. studied the same correlations at the age of 11-12 [3]. Taking into account the lack of researches devoted to correlation between technical and tactical skills (TTS) and physical preparedness level of qualified epée fencers, clarification is more than important.

The purpose is to find out the correlation between quantitative indicators of technical and tactical activity in terms of general activity and physical preparedness level of qualified epée fencers.

Methods and organization of the research. To achieve the goal the following methods were used: theoretical analysis and synthesis; pedagogical observation including the use of instrumental techniques, correlation analysis by Spirmen. Pedagogical monitoring was conducted at the competition period on the basis of Ukrainian fencing team (epée, male) after a standard warm-up, and physical preparedness level of epée fencers has been examined by a set of 20 tests. 31 trained athletes (CMS, MS, CMS of Ukraine) were tested. The competitive activity of athletes was analysed by means of video recording and taking notes of TTS. In general, there were registered 49 matches' scores in the European Championship held in July 17, 2010, in Leipzig (Germany) and L'viv region championship in fencing among juniors, held in February 22-27, 2010, in L'viv. The basic techniques were recorded to solve tactical problems in competitive activity [2.11, etc.]: movement (steps, jumps, lunge-closing, running, "arrow"), attacks (simple, with a feint, with effect on the arms, combined), protection of the response; counterattack; remises.

Results and discussion. Correlation analysis of quantitative indicators of TTS and the preparedness level of qualified epée fencers showed the presence of statistically significant $p \leq 0,05$-$0,001$ correlation. This interaction at the level of probability $p \leq 0,001$ (rkryt. $\geq 0,554$) was ascribed to the strong, at $p \leq 0,01$ (rkryt. $\geq 0,449$) – to the middle, and at $p \leq 0,05$ ($\geq$ rkryt. 0.349) – low indication. While analyses of the movement techniques, a strong correlation was found between the number of attacks carried out in the process of competitive activity and maximum power-flexor hand muscles ($r = 0,586$). On the one hand, such a relationship may be coincidental, since the hand muscles are not involved in carrying cases, and on the other hand, execution cases are usually accompanied by performance of armed hand TTS, which explains the nature of this correlation. The average correlation was found between the number of jumps in the front fencing and a maximum power of flexor hand muscles ($r = 0,464$). We can assume that this correlation is a consequence of genetic structure of athletes' muscles. Besides, the average correlation was found in the number of attacks carried out by force and extensor back muscles ($r = 0,502$), which is quite natural, because of cases requiring the maintenance of specific fencing racks and considerable power displays of leg muscles. On the medium level a statistical correlation was found between the number of hops in the front fencing and a maximum power of flexor hand muscles ($r = 0,464$), which also can be explain by the genetic structure of athletes' muscles.

Weak correlation ($r = 0,361$) was found between the number of attacks and: explosive strength of upper limb muscles (from the attack carried out mainly attacks that require additional efforts of armed hand); ability for orientation in space ($r = -0,418$), because of the effective implementation of technical and tactical skills determinant choice of the optimal distance to the opponent; special endurance ($r = 0,373$). Adversarial activity of fencers is characterized by dynamic, permanent change in the distance, the performance of attacking and defensive actions that are not possible without an appropriate level of special endurance. At the same level the correlation between the number of hops in the front fencing and explosive force of pushing leg was found ($r = 0,426$), because the appropriate level of explosive power leg enables better mobility. At the weak level also were found the correlation between number of steps that were taken in a competitive activity and total working capacity ($r = 0,404$), which is quite logical. Weak inverse correlation ($r = -0,370$) was found between the number of jumps for moving around the fencing track and general performance. It can be assumed that athletes with low overall efficiency will move to combat track mostly by steps, not by hops.

Analysis of the correlation matrix revealed statistically significant relationship between average number of simple attacks and explosive muscle strength of upper extremities ($r = 0,541$). It can be assumed that a high level of power-speed hand muscles is a prerequisite for successfully carried out simple attacks. The same level of correlation was found between the number of attacks on the influence of rival weapons and explosive muscle strength of upper extremities ($r = 0,535$), and the number of combined attacks and maximum power-flexor hand muscles ($r = 0,527$). The point is that implementation of fencers' attacks was largely accompanied by retention of weapons 770 g and repeated steps with extra efforts and constant opposition rival [12]. Our results also confirm the data by Tishler D. A. and Movshovych A. D. [10], about the significance of arm force for the effective implementation of arm attacks by epée fencers.

A weak correlation was found between the number of applied simple attacks and simple motor re-

action velocity (r =- 0, 425) and quickness of response selection of probable relationship is not established. Our results confirm the data by Movshovych A. D. with co-authors [5] found among epée fencers aged 14-16. On the one hand, this can be explained by the fact that, unlike other types of fencing, attacking action of fencer usually is not associated with the choice, and is caused by nature. On the other hand, it can be caused by specific competitive activity in epée fencing, because, unlike other types of fencing, it is not a prior action: apparatus fixes only that shot which is caused more by 0.04 s [12]. Number of applicable attacks with feints at the same level correlates with the maximum strength of flexor hand muscles (r = 0,416). A weak correlation relationship was found between the number of attacks carried out with the action of a weapon opponents and maximum power-extensor back muscles (r = 0,355) and the ability for orientation in space (r =- 0,390). Rational choice of distance during attacking actions of epée fencing makes impossible to obtain injection into armed arm or leg that is ahead. There is also a weak correlation relationship between the number of combined attacks and maximum power-extensor back muscles (r = 0,442), ability for orientation in space (r =- 0,400), special endurance (r = 0,390) and simple motor reaction time (r =- 0.381). Inverse weak links were established between the number of combined attacks and quickness of movement in the battle front (r = 0, 416) and velocity selection of reaction (r = 0,392).

Analysis of the correlation matrix, performed by number of qualified epée fencers and defense responses, and their physical preparedness level showed the presence of medium and weak relationships. In particular, on the medium level statistical relationships with the explosive power of muscles of upper extremities (r = 0,548) and maximum power-flexor hand muscles (r = 0,544) were found. This is due to the nature of these TTS because protection implies force confrontation of rival weapons and its reflection. The inverse correlation of several protections with the response were detected with the ability to play the hand muscular effort (r = 0,458). Obviously, for efficient protection of the athlete, time is needed to put the proper effort to repel rival weapons and control the extent of relaxation and muscle tension in the performance response. A similar relationship was established with the velocity selection of reaction (r = 0,450). That may be because of the fact that athletes who have worse reaction velocity selection often react to the appearance of rivals. Our findings confirm the results of research data on the correlation for epée fencers aged 11-12 [3].

Weak protection response correlation between the maximum power of muscles, back extensors (r = 0,434), simple motor reaction velocity (r =- 0,412) and specific resistance (r = 0,395) was established. It is known that timely reaction to the opponent can have a positive impact on the result of competitive activity, and appropriate level of athletes' special endurance can perform better TTS at a fatigue background [4].

Correlation matrix of quantitative indicators of counter-attacks; physical preparedness of qualified epée fencers showed the presence of strong, moderate and weak, then including both direct and inverse relationships. The strong correlation between the number of counter-attacks and explosive muscle strength of upper extremities was found (r = 0,635). This is natural, because the counterattack is a protective action to an opponent's attack. The average correlation was found between the number of counterattacks and maximum power-flexor hand muscles (r = 0,475) and special endurance (r = 0,457). It can be assumed that this is connected with the work of armed hands and holding weapons to 770 g and the inability to successfully counterattack against a fatigue background. The inverse relationship was found between the average number of counter-reaction and quickness of choice (r = 0,531). Further studies should be provided to explain this phenomenon.

A weak correlation was found between the number of counterattacks and explosive leg strength (r = 0,412), which can be explained by ahead position of an opponent in an attack not only by the movement of weapons, but also by reducing the distance. These data confirm the previous studies on this subject [7]. A weak correlation between the number of counterattacks and maximum power-extensor back muscles was found (r = 0,429). The number of counterattacks on low levels correlates with speed endurance (r = 0,448), which confirms the importance of this level in qualitative performance of different TTD during competitive match.

Qualitative performance of remises is characterized by the continuation of attacks after contact with the opponent's defense, which requires strict athlete's adherence to distance. Obviously, this is due to a strong correlation (r =- 0,453) between the number remises and ability for orientation in

space. Average relationships were found between the number of remises and special endurance (r = 0,450). With some indicators, the level of physical preparedness (mobility in the hip joints, running at 20 m on the run, moving in the battle front at a distance of 15 m, reaction to moving object) and quantitative indicators of TTS under conditions of probable adversarial correlation relationship is not established ($p \leq 0,05$).

Conclusions:

1. Existence of a large number of statistically reliable correlations between the indices of technical and tactical activity and physical preparedness demonstrates the important role of physical preparedness in the sports training system of qualified epée fencers.
2. The results of correlation analysis confirmed the role of power and power-speed special endurance in epée fencing.
3. Absence of reliable correlations between the quantitative indices of TTS and the development level of some physical qualities manifestation (flexibility, certain forms of speed manifestation) may indicate that the latter do not limit the competitive activity efficiency of qualified epée fencers.

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ВЗАИМОСВЯЗЬ ТЕХНИКО-ТАКТИЧЕСКИХ ДЕЙСТВИЙ И ФИЗИЧЕСКОЙ ПОДГОТОВЛЕННОСТИ КВАЛИФИЦИРОВАННЫХ ФЕХТОВАЛЬЩИКОВ-ШПАЖИСТОВ

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Аннотация. Эффективная реализация технико-тактических действий в вариативных конфликтных ситуациях соревновательной деятельности в фехтовании не возможна без надлежащего уровня физической подготовленности спортсменов. Цель – выявить корреляцион-

ные взаимосвязи между количественными показателями технико-тактических действий и уровнем физической подготовленности квалифицированных фехтовальщиков на шпагах.

Проведено тестирование уровня физической подготовленности фехтовальщиков-шпажистов (31 спортсмен) комплексом из 20 тестов, а также анализ соревновательной деятельности этих спортсменов с помощью видеосъемки и нотационной фиксации основных технико-тактических действий в официальных соревнованиях (ЧЕ 17. 07. 2010 г., г. Лейпциг).

Установлено наличие значительного количества (41) статистически достоверных взаимосвязей между показателями технико-тактической и физической подготовленности. Наибольшее количество статистически достоверных корреляционных взаимосвязей (34) установлено между кистевой, становой, взрывной силой мышц верхних и нижних конечностей, специальной силовой выносливостью и количественными показателями технико-тактических действий (ТТД), что свидетельствует о ведущей роли силовых и скоростно-силовых качеств, специальной выносливости в структуре физической подготовленности квалифицированных фехтовальщиков-шпажистов.

Отсутствие достоверных корреляционных взаимосвязей между количественными показателями ТТД и уровня развития отдельных проявлений физических качеств (гибкость, отдельные формы проявления быстроты) может свидетельствовать о том, что последние не лимитируют эффективность соревновательной деятельности квалифицированных фехтовальщиков на шпагах.

Ключевые слова: фехтовальщики, техника, тактика, физическая подготовленность, корреляция.

CORRELATION BETWEEN TECHNICAL AND TACTICAL ACTIVITY AND PHYSICAL PREPAREDNESS OF QUALIFIED EPÉE FENCERS

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Annotation. Effective realization of technical and tactical activity in the various conflicting conditions of competitive activity in fencing is not possible without the proper level of physical preparedness of sportsmen. The research is aimed to find out correlations between the quantitative indices of technical and tactical activity and physical preparedness level of qualified epée fencers.

Physical preparedness level of epée fencers (31 sportsmen) has been examined by a set of 20 tests, and the competitive activity of these sportsmen has been analysed by means of video recording and taking notes of the basic technical and tactical activity (EC 17.07.2010, Leipzig).

A significant number (41) of statistically reliable correlations between the indices of technical and tactical activity and physical preparedness has been found. Most of these correlations (34) have been discovered between the hand, main force, explosive force of upper and lower extremities muscles, special endurance, and the quantitative indices of TTS, which proves the leading role of power qualities, speed-power qualities and special endurance. Absence of reliable correlations between the quantitative indices of TTS and the development level of some physical qualities manifestation (flexibility, certain forms of speed manifestation) can testify that the latter do not limit the competitive activity efficiency of qualified epée fencers.

Key words: fencers, technique, tactics, physical preparedness, correlation.

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