

ОСНОВИ СПОРТИВНОГО ТРЕНУВАННЯ

LEFT-HANDED AND RIGHT-HANDED FENCERS IN THE INTERNATIONAL SPORTS ARENA: SPECIFICS OF THEIR COMPETITIVE ACTIVITY AND FEATURES OF IDENTIFICATION

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Abstract

Research purpose: To study the features of left-handed and right-handed fencers' competitive activity, to justify the tendency of increasing the representation of left-handed fencers in the international sports arena and to substantiate the need to take into account the functional asymmetry of fencers in the initial stages of sports training.

Material and Methods. 54 international competitions and 2,395 athletes were studied. The survey was attended by 25 coaches. The study of individual profiles of asymmetry involved 9 qualified fencers. During the research, the following methods were used: analysis of scientific and methodological literature and materials from the Internet, analysis of competition protocols and video analysis, sociological methods of research, pedagogical observation, pedagogical testing, methods of mathematical statistics.

Results. Among the features of competitive activity of fencers with different leading extremities are: increase in the number of various attacks and counterattacks of the right-handed athletes and widespread use of complex and more varied technical and tactical actions, while the speed of performing techniques and actions can be reduced due to the lack of competitive practice with left-handed athletes; left-handed athletes' widespread use of simple attacks without transference with high speed.

The number of left-handed fencers from 2002-2003 to 2016-2017 sports seasons increased by 48 athletes. Today, they are between 12 and 42% in the first 50 world rankings. The largest number is in teams of Russia, Italy, the USA, and China. Of the 146 left-handed athletes, 45% (66 people) represent Russia, Italy, the USA, and China in the top ten. Cases of incorrect orientation of fencers' training were identified. This determines the relevance of accounting for functional asymmetry at the initial stages of training.

Conclusions. The features of duel between the fencers with dominant right and left extremities, tendency to increase the number of left-handed fencers in the international sports arena from 2002 to 2017 were determined. Fencers' individual profiles of asymmetry were studied, cases of incorrect orientation of athletes' training were identified.

Keywords: fencing, right-handed fencers, left-handed fencers, asymmetry.

Introduction

Fencers' competitive activity is characterized by rapid change in combat situations. This requires fencers

to be extremely focused and quick to make decisions that determine the outcome of the match (Ulan, 2016). Today in modern fencing preference is given to left-handed athletes who are uncomfortable and unusual rivals. They demonstrate high competitive performance, and their percentage among winners in international fencing competitions is increasing annually (Shynkaruk, & Ulan, 2016).

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According to scientists (Oldfield, 1971; Kabanov, 2009), about 10-15% of athletes in the world are left-handed, but in fencing they are about 25%. The increase in their number is explained by the specificity of sports selection and orientation, which is implemented in some countries. This approach of selection and orientation is based on the choice of “uncomfortable” left-handed athletes, or even the re-training of right-handed fencers to possess a subdominant limb from nature (Kudriashova, Berdichevskaia, & Martynenko, 2015).

The identification of athletes with a left motor profile in the initial stages of training significantly increases the efficiency of the sports selection's and orientation's process of young athletes' training (Shynkaruk, 2012; 2013). The effectiveness of the process of long-term training in sports largely depends on the detected athletes' inclinations, including genetically determined propensity to possess one of the extremities (Fedorchuk, Lysenko, & Shynkaruk, 2019). It can be assumed that this tendency to increase the number of left-handed fencers in the international arena will continue in the future (Shynkaruk, & Ulan, 2016).

Scientists' works (Sologub, & Taimazov, 2000; Moskvina, & Moskvina, 2010; Sanchis-Moysi, Idoate, Olmedillas, Guadalupe-Grau, Alayón, Carreras, Dorado, & Calbet, 2010) are devoted to the problem of left-handed and right-handed athletes' training. In particular, some studies concern the construction of training and methods for managing motor asymmetry in complex-coordination sports, sports games (Korobova, & Shulpina, 2013; Kostiukevych, Shchepotina, Shynkaruk, Kulchytska, Borysova, Dutchak, Vozniuk, Yakovliv, Denysova, Konnova, Khurtenko, Perelytsia, Polishchuk, & Shevchyk, 2019). The features of the styles of duels by athletes with different profiles of asymmetry, the psychophysiological characteristics of left-handed and right-handed fencers were studied by specialists in fencing (Kabanov, 2009; Rydnyk, 2011; Ulan, 2016). However, to date, the issues have not covered the quantitative ratio of left-handed and right-handed athletes specialized in fencing in different types of weapons; their analysis in terms of representation on the international sports arena; research of the features of left-handed and right-handed fencers' competitive activity. The foregoing suggests that the study is relevant and timely.

Research purpose – to study the features of left-handed and right-handed fencers' competitive activity in different types of weapons, to justify the tendency of increasing the representation of left-handed fencers on the international sports arena and to substantiate the need to take into account the functional asymmetry of fencers in the initial stages of sports training.

Material and methods

Research participants

2395 athletes were studied: 1200 athletes from the international rankings (the first 50 seats in each weapon category in two age categories – seniors and juniors by result of two sports seasons), 1195 athletes from Russia, Italy, the USA and China who are in the international ranking rating (age category – seniors, based on the results of two sports seasons). The survey was attended by 25 respondents – first and highest category coaches of Russia, Ukraine and China. Nine

qualified fencers – members of national teams of Ukraine participated in the study of individual asymmetry profiles.

Organization of research

During the research methods were used: analysis of scientific and methodological literature and materials of the Internet, analysis of competition protocols and video analysis, sociological methods of research, pedagogical observation, pedagogical testing, methods of mathematical statistics.

The materials of the official site of the International Fencing Federation made it possible to carry out a statistical analysis of right-handed and left-handed fencers in the world ranking according to several sports seasons. In total, 54 international competitions were analyzed: 2002-2003 – 18 competitions, 2014-2015 – 18 competitions, 2016-2017 – 18 competitions.

The analysis of competition protocols and video analysis was conducted to determine the characteristics of the fights of athletes with different manual asymmetries.

The sociological methods of the survey used the method of questioning, which allowed to determine the features and difficulties of the fight between the right-handed and left-handed fencers, the opinions of coaches, based on their own practical experience, about the representation of left-handed athletes in international fencing competitions (Byshevets, Denysova, Shynkaruk, Serhiyenko, Usychenko, Stepanenko, & Syvash, 2019; Kostyukevich, & Shynkaruk, 2019).

To determine individual asymmetry profiles, tests were used to identify the leading arm (“Grip of fingers”, “Pose of Napoleon”, “Shoulder test”, “Drawing blind”, “Hand used in drawing”), leading leg (“Foot to foot”, “One-foot bouncing”, “Chair climbing”, “Step forward”), leading eye (Rosenbach test, Dolman method, “Aim”, “Spyglass”) and leading ear (“Handset”, “Clock ticking”). After performing the tests and collecting data, the K_{as} was determined:

$$K_{as} = ((E_r - E_l) / (E_r + E_l + E_a)) \times 100$$

where K_{as} – coefficient of asymmetry; E_r – number of right-dominated tests; E_l – number of tests with dominance of the left side; E_a – number of tests without one party's dominance.

Positive value of the K_{as} showed a right domination, negative – about the left domination, the value of 0 – symmetry (ambidexterity) (Ulan, 2018).

Statistical analysis

Statistical processing of the data was performed using the Excel 2010 spreadsheet editor (Microsoft, USA, 2010), the average was used.

Results

Analysis of qualified fencers' competitive activities, the results of coaches' survey allowed to establish that the fight between the right-handed and left-handed fencers is characterized by complicated combat (Gamalii, Bakum, Shevchuk, & Khabinetc, 2017). The “unusual” battle between right-handed and left-handed fencers and between left-handed and the left-hander fencers, the lack of competitive practice with this category of athletes in most cases becomes a limiting factor to achieving a high result of the competition. The “mirror

position” on the fencing track makes the left-handed athlete an uncomfortable rival for the right-hander, which stimulates the left-handed athlete to continually shift toward the more likely hit the left-handed fencer’s surface of body (Fig. 1).

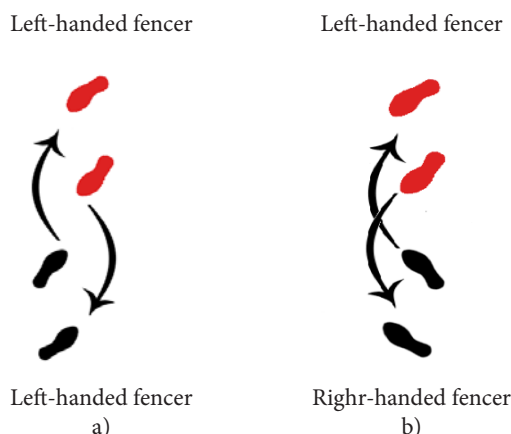


Fig. 1. Scheme of the location of athletes with different manual asymmetry on the fencing track: a) schematic representation of a duel of two fencers with left-hand manual asymmetry, b) schematic representation of a duel of left-handed and right-handed fencers

Were identified and substantiated the specific features of duel with left-handed athlete (Ulan, 2016). These include increasing the number of attacks and counterattacks by a right-handed athlete in line with changes of the opponent’s surface of body. Left-handed athletes prefer simple attacks without translations, which are characterized by high speed of execution. Right-handers are more likely to use complicated and more diverse technical and tactical actions, and their speed may be reduced due to the lack of competitive practices with left-handed athletes (Fig. 2).

The percentage of athletes who fence with their left hand was determined by the results of their performances during 2002-2003, 2014-2015 and 2016-2017. Among the first 50 athletes in the World Fencing Federation World Ranking, the number of fencers in different weapons varies from year to year. According to the results of 2002-2003, the number of left-handed fencers on the international arena was 104 athletes, their percentage ranged from 10 to 24%. Until 2014-2015, the dynamics of the number of left-handed fencers in the direction of increase (149 athletes) is observed, their percentage compared to right-handed fencers ranged from 16 to 40%, which averaged 25.3%. In 2016-2017, the number of left-handed fencers amounted to 152 athletes (from 12 to 42%, which averaged 24.2% of the total number of athletes) (Fig. 3) (International fencing federation, 2018).

The largest number of left-handed athletes in teams of countries such as Russia, Italy, USA, China, Korea, Hungary, Japan, Germany, Poland and France. Russia, Italy, the USA and China also occupy leading positions among other countries in international fencing competitions (Fig. 4).

The analysis of the number of left-handed and right-handed fencers of the high-ranking leading countries (Russia, China, USA and Italy) in different types of weapons and presented in the world rankings (age category – seniors) showed that the number of left-handed athletes of the two sports seasons are increases. According to the 2012-2013 sports season, the number of left-handed fencers (men and women) in Russia, Italy, the USA and China, who are represented in the international rankings by three weapons (epee, foil and sabre) in the age category “senior”, amounted to 121 athletes. Over the course of 3 years, their number has increased by 27 athletes and in the 2016 – 2017 sports season was 148 athletes (Fig. 5).

In Russia, the number of left-handed athletes has increased by 8 athletes, in Italy – by two athletes, in the USA – by 16 athletes and in China – by one fencer. The analysis

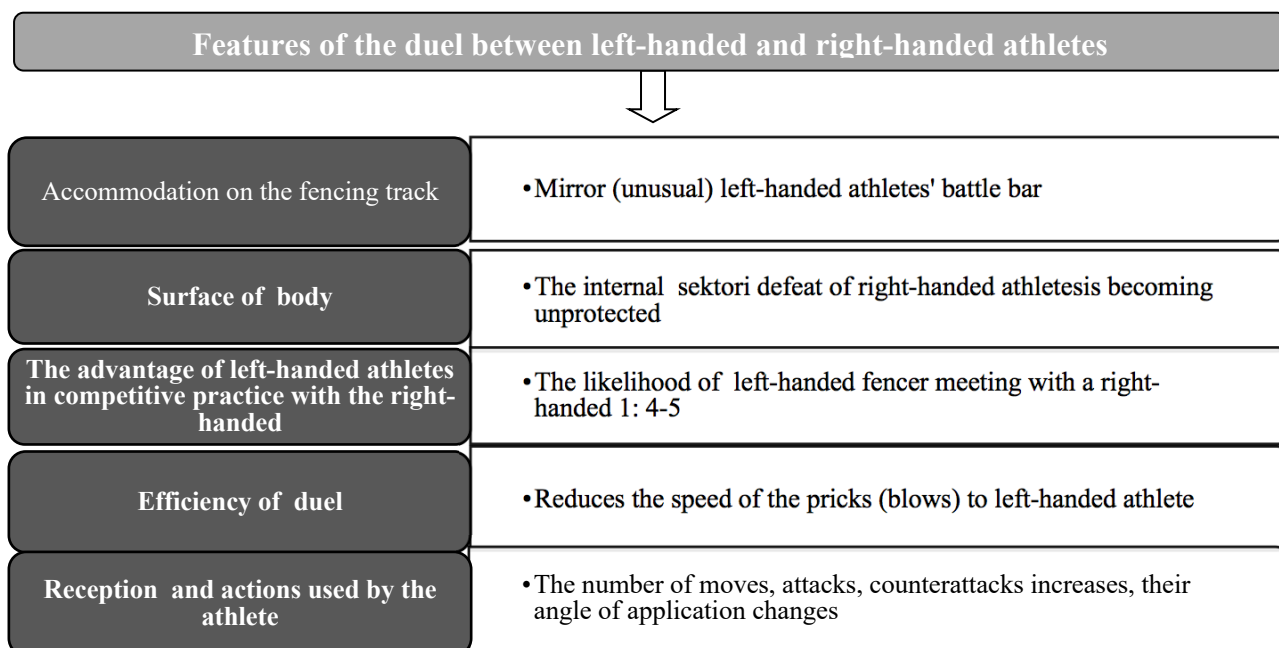


Fig. 2. Specific features of the duel between left-handed and right-handed athletes

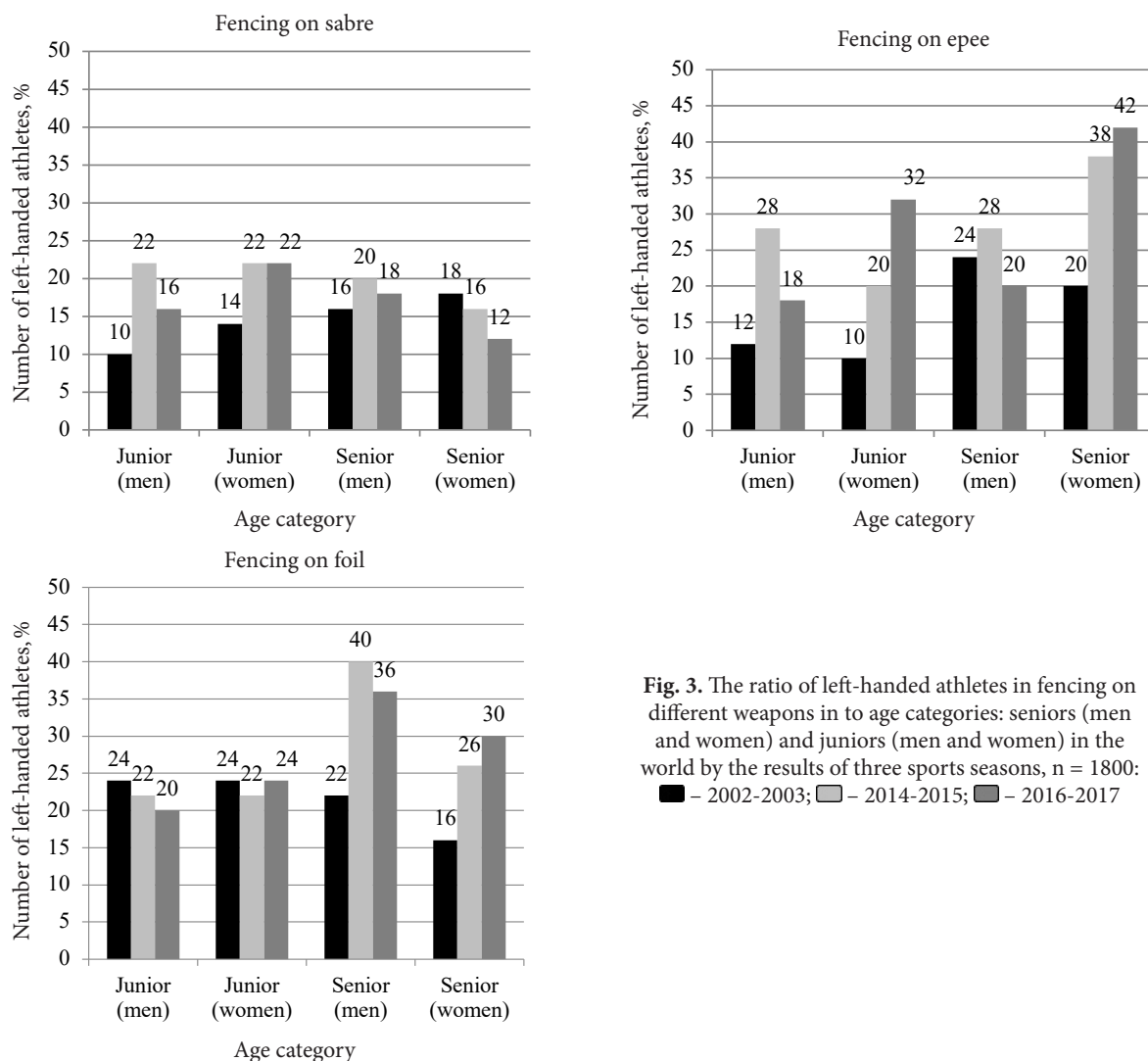


Fig. 3. The ratio of left-handed athletes in fencing on different weapons in to age categories: seniors (men and women) and juniors (men and women) in the world by the results of three sports seasons, n = 1800: ■ – 2002-2003; □ – 2014-2015; ▒ – 2016-2017

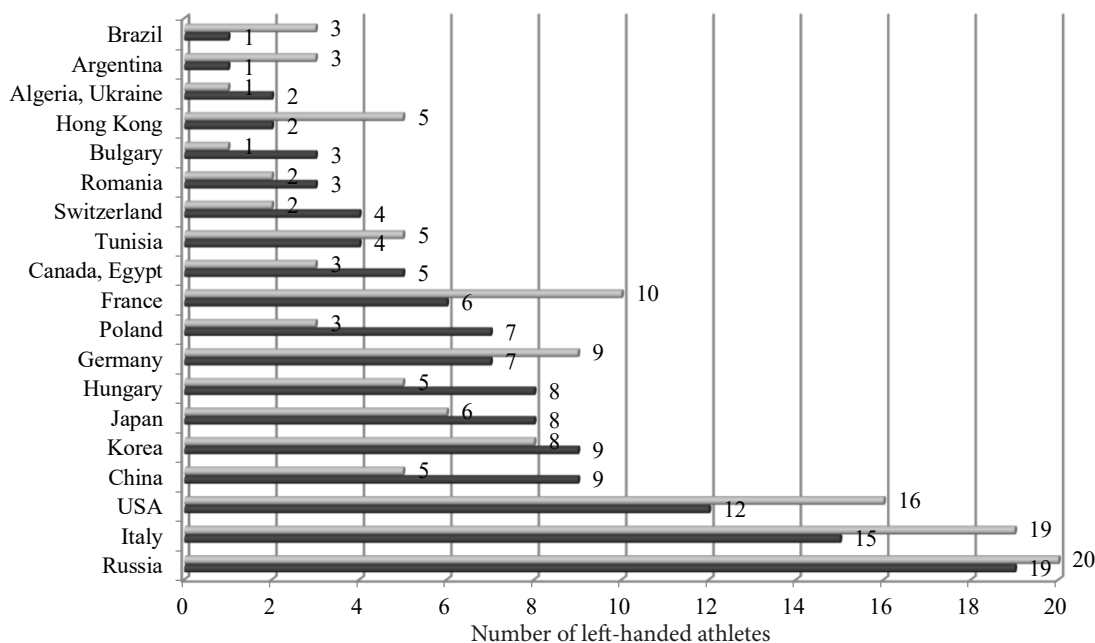


Fig. 4. The number of left-handed fencers represented in the FIE rating based on the 2014 – 2015, 2016 – 2017 seasons (n=301): ■ – 2014-2015; □ – 2016-2017

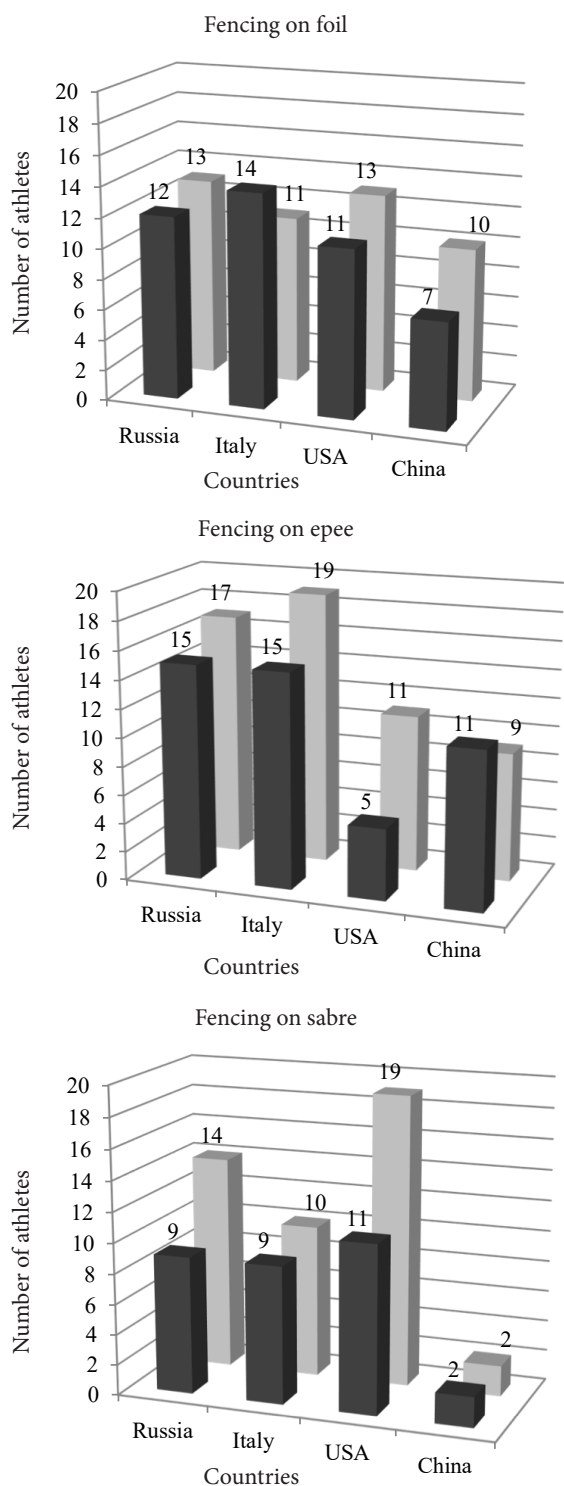


Fig. 5. Number of left-handed athletes representing the leading fencing countries: Russia, Italy, USA and China according to the two sports seasons 2012-2013 and 2016-2017 (n=269): ■ – 2012-2013; □ – 2016-2017

of practical experience and the survey of foreign coaches allowed to find out that in Russia, during the selection of athletes, the coaches prefer the left-handers, as evidenced by the tendency to increase their number on the international arena, presented in our study. At the same time, coaches and athletes

claim that at major international competitions, almost half of athletes are fencing with their left hand. Among them there are those who are retrained to fence with their left-hand.

Left-handed athletes specializing in fencing in different weapons also occupy leading positions in rating and competitions (Fig. 6).

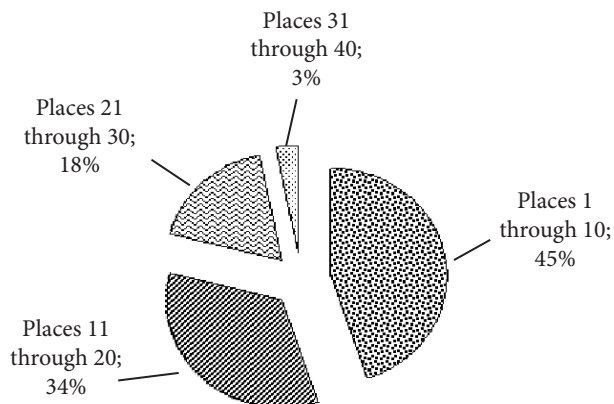


Fig. 6. Percentage of left-handed athletes specializing in fencing in different weapons according to the places they rank in the FIE World Ranking (n = 146): ■ – places 1 through 10; ▨ – places 11 through 20; ▩ – places 21 through 30; ▪ – places 31 through 40

Among 146 left-handed athletes (among the top 50 athletes in the ranking), specializing in fencing in different weapons, 45% of fencers (66 people) ranked 1 to 10. 34% (50 people) of athletes are ranked 11-20 in the world rankings. 18% (26 people) of left-handed fencers are ranked 21 to 30 in the ranking and about 3% (4 people) are in the 31-40 positions.

The analysis of the international ranking also revealed data on the distribution of left-handed athletes who ranked 1 to 10 in the international FIE ranking, depending on the countries they represent on the international arena and the type of weapons in which they specialize (Fig.7).

The largest percentage of left-handed male athletes who hold the leading positions in the ranking, compared to other representatives of the leading countries, in sabre fencing (57%), and women in epee fencing (100%) have representatives of Russia. Among the left-handed athletes of China, the highest ranking representatives of fencing on epee (83%) and foil (80%). The same number among female athletes of China and Italy in fencing on foil – 50%.

The largest percentage of left-handed female athletes – representatives of Italy is observed in women's fencing on sabre (75%). Left-handed fencers – USA representatives rank in the rankings from 1 to 10 and make up 25-60%.

The successful performance of left-handed fencers in competitions determines the need for identification of this category of athletes.

However, studies (Gronskaia, 2012) have shown cases of planing of sports training for fencers without taking into account the predisposition of athletes to own one or another limb. In the course of the study, individual asymmetry profiles of nine qualified fencers from Ukraine were determined on the basis of the study of motor and sensory asymmetries (Ulan, 2018) (Tab. 1).

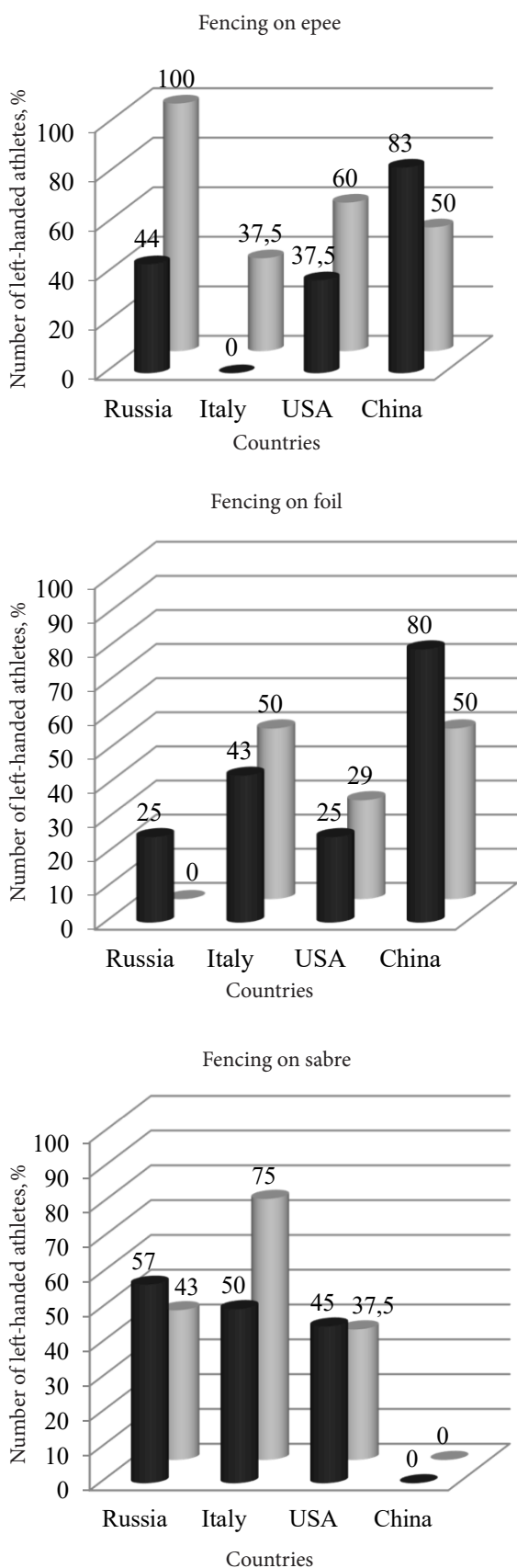


Fig. 7. Percentage of left-handed fencers among leading fencing countries – Russia, Italy, the USA and China (n=66): ■ – senior (men), □ – senior (women)

Table 1. Individual asymmetry profiles of qualified fencers (n=9)

№	Athlete	Type of asymmetry				IPA
		manual asymmetry	asymmetry of the lower extremities	visual asymmetry	auditory asymmetry	
1.	A-k	L	L	L	L	LLLL
2.	B-ko*	R	R	R	L	RRRL
3.	B-va	L	L	L	L	LLLL
4.	B-k*	R	R	R	R	RRRR
5.	S-kov*	R	R	R	R	RRRR
6.	S-ko*	R	R	R	L	RRRL
7.	H-va*	L	R	R	R	LRRR
8.	Z-ta*	L	R	R	R	LRRR
9.	Sh-va*	L	L	L	L	LLLL

Note: IPA – individual asymmetry profile, L – dominance of left signs, R – dominance of right signs, LLLL – absolute left-handed people, RRRL – mostly right-handed people, RRRR – absolute right-handed people, LRRR – hidden left-handed people or left-handed right-handed people, * – athletes, who fence with the right hand

As can be seen from the table, the athletes numbered 7, 8 show hidden signs of left-handedness. According to the results of the study, the athlete at number 9 turned out to be “absolute left-handed”. At the same time, the mentioned athletes are fencing with their right hand and have never practiced fencing with the opposite left hand in their sports activities, which indicates the incorrect orientation of their sports training, based on knowledge about the asymmetry of the upper limbs.

Discussion

Sologub and Taimazov (2000) suggest that the left-handed athlete is an inconvenient rival for the right-handed because of the features of his postures and movements performed by him in the course of competitive activity. Scientists (Taimazov, & Bakulev, 2006; Moskvina, & Moskvina, 2010) say that left-handed athletes win about 40% of the medals at international competitions, despite the fact that their share in the world is only 10% of the total population.

In the own research, new data have revealed the features of fencing duels of athletes with different manual asymmetry. In particular, such a fight is characterized by a “mirror” (unusual for the right-handed athlete) battle bar, a decrease in the speed and angle of pricks (blows), opening the right-handed fencer’s internal sektori defeat of the surface of body, increasing the number of movements and counterattack. First of all, such a duel is characterized by a small experience of competing between athletes with different motor profiles.

The results of our own studies confirm the data of the authors (Kabanov, 2009) regarding the increase in the number of left-handed athletes on the international arena and their success compared to right-handed fencers. The study first identi-

fied and described data on the representation of left-handed and right-handed athletes on the international arena. There is a tendency for an increase in the number of left-handed fencers from 2002 to 2017. For the first time, the ratio of left-handed and right-handed fencers representing the fencing leading countries (Russia, Italy, USA and China) and their representation in fencing on different weapons are analyzed.

It should be noted that experts say (Guchetl, 2012; Malazoniia, & Gronskaia, 2016), and the results of own studies confirm the need for comprehensive and timely identification of athletes' functional asymmetry. Specialists recommend studying asymmetry in a comprehensive way, with the construction of individual profiles of athletes asymmetry (Nikitiuk, 1985; Ilin, 2004; Moskvina, Moskva, 2010). The results of our own studies confirm that there are cases where hidden (congenital) signs of asymmetry may differ from signs of asymmetry acquired in the course of sports activities, which requires the identification of athletes' asymmetry at the beginning of their training.

The prospect of further research is a comprehensive definition of functional asymmetry of young athletes, determination of their profiles of functional asymmetry; the construction of model characteristics of the competitive activity of fencers taking into account manual asymmetry, which can be used by coaches in the process of athletes' training.

Conclusions

The Features of duel between the fencers with dominant right and left extremities were determined: the unusual position of the left-handed opponent on the fencing track, which makes it difficult to fight; right-handed athlete performing techniques and actions in an unusual way reduces their speed and efficiency; the right-handed athlete uses more movements and techniques to make pricks or blows to the left-handed opponent.

Tendency to increase the number of left-handed fencers on the international sports arena from 2002 to 2017 were determined. Leading fencing countries – Russia, Italy, the USA and China – are characterized by a significant number of left-handed fencers in their teams. This is probably one of the main factors that allows these countries to hold a leading position in the fencing.

Left-handed fencers rank high in the world rankings and at international competitions. 45% of left-handed athletes are in the top 10 in the world ranking.

Individual profiles of the asymmetry of fencers were studied, cases of incorrect orientation of the training of athletes on fence with non-dominant hand in their sports activities were identified. The need for taking into account the functional asymmetry of fencers at the initial stages of sports training was determined.

Conflict of interest

The authors state that there are no conflicts of interest.

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ЛІВОРУКІ І ПРАВОРУКІ ФЕХТУВАЛЬНИКИ НА МІЖНАРОДНІЙ СПОРТИВНІЙ АРЕНІ: СПЕЦИФІКА ЗМАГАЛЬНОЇ ДІЯЛЬНОСТІ ТА ОСОБЛИВОСТІ ЇХ ВИЯВЛЕННЯ

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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 – вивчити особливості змагальної діяльності праворуких і ліворуких спортсменів у фехтуванні на різних видах зброї, встановити тенденцію збільшення представництва ліворуких фехтувальників на міжнародній спортивній арені та обґрунтувати необхідність урахування функціональної асиметрії фехтувальників на початкових етапах спортивного тренування.

Матеріали і методи. Було проаналізовано 54 міжнародних змагання та вивчено 2395 спортсменів. В опитуванні

прийняли участь 25 тренерів. У дослідженні індивідуальних профілів асиметрії брали участь 9 кваліфікованих фехтувальників. Під час досліджень використовувалися методи: аналіз науково-методичної літератури та матеріалів мережі Інтернет, аналіз протоколів змагань та відеоаналіз, соціологічні методи дослідження, педагогічне спостереження, педагогічне тестування, методи математичної статистики.

Результати. Серед особливостей поединку ліворукого і праворукого фехтувальників: збільшення кількості різ-

них атак і контратак праворуких спортсменів; широке використання ліворукими спортсменами простих атак без переведень з високою швидкістю їх виконання; широке використання праворукими фехтувальниками складних і більш різноманітних технічних і тактичних дій, при цьому швидкість їх виконання може знижуватися через відсутність змагальної практики з лівшами.

Кількість ліворуких спортсменів за період з 2002-2003 по 2016-2017 роки збільшилася на 48 спортсменів. Сьогодні вона становить від 12 до 42% від загальної кількості спортсменів, представлених у першій 50-ці світового рейтингу. Найбільша кількість ліворуких фехтувальників – в командах Росії, Італії, США та Китаю. Зі 146 ліворуких спортсменів 45% (66 осіб) представляють Росію, Італію, США і Китай у першій десятці. В той же час жоден ліворукий спортсмен

не представлений в рейтингу на 41-50 місцях. У процесі дослідження індивідуальних профілів асиметрії були виявлені випадки використання фехтувальниками під час ведення поєдинку не домінуючої руки, що свідчить про неправильну орієнтацію підготовки спортсменів.

Висновки. Визначено особливості поєдинку між фехтувальниками з домінуючими правими і лівими кінцівками. Виявлена тенденція до збільшення кількості ліворуких фехтувальників на міжнародній спортивній арені з 2002 по 2017 рік. Вивчено індивідуальні профілі асиметрії фехтувальників, виявлені випадки неправильної орієнтації тренування спортсменів на фехтування субдомінантною рукою.

Ключові слова: фехтування, праворукі фехтувальники, ліворукі фехтувальники, асиметрія.

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