

## KINESIOLOGY & COACHING

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## Participation Tactics of Elite Fencers in Competition System in 2004–2016 Olympic cycles

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**Key words:** tactical training, competition, athlete, ranking, Olympic Games

### Abstract

Background. Tactic is one of the basic terms in fencing. Most authors consider it only during the bout.

Problem and aim. Instead, the participation tactic in particular events or during the season is covered fragmentally and needs proper substantiation. The study aimed to analyze the specifics of the participation tactics of elite fencers in the competition system during three Olympic cycles from 2004 to 2016.

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Methods. Theoretical analysis, documentary method, generalization of literature and Internet data allowed for the identification of the problematic field of tactics in fencing. We then analyzed the individual profiles of 72 elite fencers on FIE website during three Olympic cycles from 2004 to 2016 (total amount of events, results at World Cups, Grand Prix, World Championships, positions in FIE Ranking List, medal achievements). The results were processed using STATISTIKA 10.0 and Microsoft Excel software.

Results. Competition practice of elite fencers differs depending on the season. In 2004-2008 and 2008-2012, most of them increased their participation during the 1st-3rd seasons from 6.96 to 11.08 events (average mean). In the 4th season competition practice included 9.00 tournaments. In 2012-2016 competition practice of most athletes subsequently grew from 7.30 events in the 1st season to 9.63 in the 4th. The dynamics of fencers' results differed depending on the season.

Conclusions. According to the dynamics of fencers' results, five types of participation tactics were identified: leadership holding, a gradual increase of FIE Ranking position, combined tactics, holding FIE Ranking position and leadership coming back. A group of athletes combined performances in a few age categories: Cadets, Juniors and Seniors.

## Introduction

Tactic is one of the basic terms in combat sports [Harmenberg 2007; Platonov 2015; Johnson 2017]. In most papers, it means specialized activities and plans used to solve tactical tasks in bouts or their fragments [Tyshler, Ryzhkova 2010; Latsyshev *et al.* 2020]. From this point of view, the choice of proper tactical scheme or plan for a bout depends on the competition rules, positive and negative characteristics of athlete's preparedness, and the level of mastership of his or her opponents or team members (for team events) [Ryzhkova 2014]. This definition is used as a basis for understanding the term “competition tactics” [Kogler 2004; Kriventsova *et al.* 2017].

At the same time, Tumanyan [2006] emphasizes the need to consider tactics as specialized activities at four levels: 1 – in a particular moment of a bout, 2 – during the whole bout, 3 – during the competition or at various stages, 4 – in the competition system. Using the example of wrestling, the author explains the difference between tactics and strategy. In his opinion, strategy is a general plan which should be implemented at each of four levels. Tactic is the range of special actions used for the achievement of a particular aim. For example, strategy for the 1<sup>st</sup> level (in a particular moment of a bout) is to score a point, while tactics means the use of certain actions (for example, active/passive attacking or defense, preparatory or actual actions). The strategy for the 2<sup>nd</sup> level (during the whole bout) is a plan to win the bout with a particular score, while tactic means the use of tactical style – pressing, maneuvering, attacking or defending. Strategy for the 3<sup>rd</sup> level (during the competition) aims to demonstrate a result (medal or certain place), which allows the athlete to join the national team or to increase his or her ranking position. Tactics includes the choice of effective tactical schemes for the bouts against various opponents. At the 4<sup>th</sup> level (participation in the competition system) strategy aims to qualify for the Olympic Games and to win a medal, while tactic means demonstration of planned dynamics of results at various tournaments [Tumanyan 2006].

The issues of tactics and tactical training in combat sports are widely covered [Allerdissen *et al.* 2017; Baidachenko, Gamaliy, Shevchuk 2018]. Over the past five

years, most of the papers has been devoted to the analysis of competitive performance indicators and their changes after implementation of new competition rules [Bober *et al.* 2017; Chen *et al.* 2017; Kaiser *et al.* 2017]. Based on the ideas of Tumanyan [2006] about four levels of tactics, we may conclude that most attention is paid to the 1<sup>st</sup> and 2<sup>nd</sup> levels (the whole bout and its fragments) [Guittet, Palmari 2010; Tarrago *et al.*, 2016]. Instead, participation tactics in the competition system is covered fragmentally. In fencing this issue was researched by Borysiuk [2007], Tarrago *et al.* [2016], Ryzhkova [2014], Turner *et al.* [2016]. However, the main accent in their works was made on model parameters of technical and tactical actions of elite fencers without taking into account the stage of competitions and the level of event (World Cup, World or European Championship, The Games of Olympiad). Other researches in fencing are devoted to the improvement of athletes' tactical skills [Chen *et al.* 2015; Bober *et al.* 2017; Szajna, Bak, Kulasa 2019].

We agree with most authors on the need for a detailed analysis of the athletes' performance in the context of studying tactics. However, we believe that the participation tactics in the competition system is based on the current trends of Olympic combat sports and needs more attention. These trends in fencing over the last 10-15 years include the complications the Olympic qualification system, innovations in competition rules, increase of rivalry in individual and team events [Briskin *et al.* 2018; Zadorozhna *et al.* 2020, 2021]. According to this, the issue of participation tactics in the competition system in fencing is actual.

**The purpose of the research** was to analyze the specifics of participation tactics of elite fencers in the competition system during three Olympic cycles from 2004 to 2016.

## Methods

Our research consisted of several stages. Theoretical analysis and generalization were used during work with literary sources on the problems of research and identification of the main problems of tactics and tactical training in fencing.

The next step included an expert assessment devoted to the issues of tactical training (February – August 2019). The experts ( $n = 8$ ) were well educated (4 among them held Ph.D. diplomas) and experienced – 2 coaches of the national teams (one of the Ukrainian national team, one of the USA national team), 2 world category referees, and 2 athletes–national team members. On average, experts had almost 15 years of experience in training fencers of different ages.

The questionnaires were administered to the experts in two different ways. 5 questionnaires were administered in a paper form and filled under the supervision of the researcher. The other 3 questionnaires were distributed by e-mail. Each expert was asked to rank the components of tactical training in each section. The number of components in sections ranged from 5 to 10. Rank 1 was always considered the most significant. The highest rank indicated the least important component (eg. in a section with 9 components, rank 9 was the least important). In order to confirm the accuracy of the answers, the concordance coefficient was determined in each group of experts ( $W$ ). The statistical validity of the concordance coefficient was verified using the  $\chi^2$  criterion (Pearson's chi-squared test). According to Shiyani, Edinak, Petryshyn [2012], the critical value of the concordance coefficient was defined as  $W=0.5$ . Therefore, at  $0.69 > W \geq 0.5$ , the agreement of experts' opinions was evaluated as average, at  $W \geq 0.7$  as high (strong), and at  $W > 0.5$  as low (weak).

In this part of the research, we took into account the expert's opinion on three questions. We discovered that control of elite fencers' tactics and tactical preparedness should be based on the analysis of competitive performance and results in particular competitions (average ranks 1.63 and 1.68 respectively,  $W=0.53$ ,  $p < 0.05$ ). The main component of tactical training for elite fencers is the improvement of tactical thinking: how to trick an opponent and make him make a mistake during the fragment of the bout, the whole match or at different stages of competitions, how to choose proper tactics for competitions of different levels such as World Cups, World and Continental Championships, The Games of Olympiad (average rank 1.50,  $W=0.56$ ,  $p < 0.05$ ). The main components influencing the training strategy for competitions are functional preparedness and psychological status of athletes and the level of technical and tactical skills of athletes (average ranks 1.63 and 2.63 respectively,  $W=0.36$ ,  $p < 0.05$ ). We also discovered that 100 % of experts insist on the differentiation of tactical training for individual and team events. The results of this part of the research were discussed in our previous papers [Zadorozhna *et. al.* 2021].

The next step of the research (September 2020 – January 2021) was an analysis of individual profiles on FIE website of top-4 fencers of the Games of XXXIX, XXX and XXXI Olympiads. In total, we analyzed the results of 72 elite fencers, representatives of all weapons: 24

athletes per each Olympic cycle (2004-2008, 2008-2012, 2012-2016). To make conclusions on their participation tactics our attention was focused on such indicators in individual events:

- the number of competitions in which each athlete participated during the season (absolute value and percentage of the maximum number of competitions for his or her weapon);
- results at the main competitions of the season. According to the specifics of the official competition calendar of FIE, during the 1<sup>st</sup>-3<sup>rd</sup> seasons – at the World Championships, in the 4<sup>th</sup> – at the Olympic Games;
- the number of competitions in which the athlete won medals during the season (percentage of the total number of competitions in which he participated during the season, hereinafter – “indicator of medal achievements”);
- the ratio of competitions of different categories in which the athlete took part during the season (including unofficial competitions in the competition calendar);
- the highest and lowest result during the season;
- the number of competitions in which the athlete finished at different stages – 1/4, 1/8, etc. (percentage of the total number of competitions in which the athlete participated during the season);
- position in the official FIE Rankings for each season.

#### Statistical Analysis

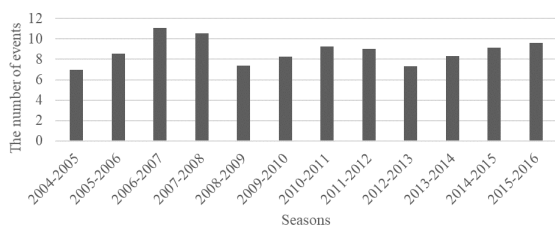
The obtained data were statistically processed using the STATISTIKA 10.0 software and Microsoft Excel 2016. The data are represented as the average mean  $\pm$  standard deviation (SD), Max – maximum in the season; Min – the minimum in the season. Shapiro-Wilk's test was used to check the normality of the distribution of competition practice and results of 72 elite fencers during each season. This test was also used to check the normality of the distribution of the same indicators in five groups of athletes who used different types of participation tactics. In order to determine the significance of differences of the results in each group during the whole Olympic cycle 2013-2016 we used parametric and non-parametric tests. In the case of the normal distribution of indicators, we used the single-factor analysis of variance ANOVA. In the case of absence of the normal distribution, we used non-parametric Kruskal-Wallis H-test. If the indicators in one season were normally distributed, but in other seasons there was absence of normal distribution, we used both tests ANOVA and Kruskal-Wallis H-test. Method Bonferroni was used for correction in both tests. The level of statistical significance of differences was set at  $p \leq 0.05$ .

#### Results

According to the official FIE competition calendar, competition season in fencing begins after the end of

the regular World Championship, which is held once a year and ends with the next World Championship. During the season, athletes can obtain ranking points in competitions of the following categories: World Cup (category A), Grand Prix, Zonal Championships (Europe, Asia, America, Africa), and Satellite. The position in the official FIE Ranking List is formed on the basis of the results during the season by adding points. This takes into account the seven best results, five of which should be demonstrated at the World Cup, Grand Prix and Satellite, two – at the Zonal and World Championships. One year after a particular tournament, the points obtained for participating in it are canceled. Therefore, in order to improve or maintain the position in the Ranking List, the athlete is interested in participating at least in seven tournaments per year.

One of the features of the participation tactics of elite fencers in the competition system in 2004-2008 and 2008-2012 was a gradual increase of competition practice during the 1<sup>st</sup>-3<sup>rd</sup> seasons (6.96-11.08 and 7.41-9.25 events) and its reduction in the 4<sup>th</sup> (10.54 and 9.00 tournaments, respectively, Figure 1).



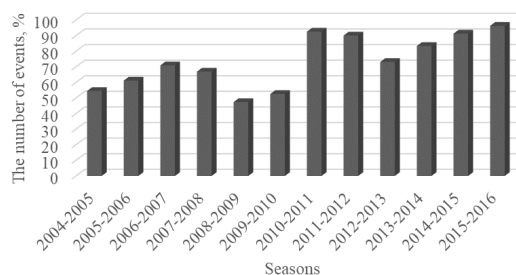
**Figure 1.** The comparison of the number of competitions in which 72 elite fencers participated during the season from 2004 to 2016

Instead, in 2012-2016, competition practice increased in each season – from 7.30 tournaments in the 1<sup>st</sup> to 9.63 in the 4<sup>th</sup>. During three Olympic cycles, most athletes preferred to take part in the events with more rating points (Grand Prix and World Cup events). Participation in Satellite and other events was episodic (one or two contests per season).

At the same time, in the Olympic cycles of 2004-2008 and 2008-2012, the maximum percentage values of competition practice were 70.90 and 92.50% of tournaments, respectively. In 2012-2016, this indicator increased to 96.25% (Figure 2). This illustrates that the participation tactics involved attending the maximum possible number of tournaments to improve or maintain a position in the FIE Ranking List.

We compared the results of 72 elite fencers during each season and within certain Olympic cycles and discovered that the dynamics of their achievements was different. According to this dynamics, we divided fencers into 5 groups. Each of them used special types of participation tactics during the whole Olympic cycle. The first group included fencers who used tactics of

leadership holding (Table 1). In 2004-2008 this type of tactic was used by 11 athletes, in 2008-2012 – 9, in 2012-2016 – 6. All of them demonstrated high results almost in all competitions during the season. The position in FIE Ranking List was from 1 to 8 place. The exception was only V.V. (Italian Republic) who participated only in one event (World Championship) in 2004-2005 and won gold medal. They did not take part in other events in that season that is why their position in FIE Ranking List was not high (20 place). As for indicator of medal achievements, in the 2012-2013 season the exception was R. F. (Italian Republic) who did not win any medals. But in most events it finished at 5-8 places.



**Figure 2.** The comparison of the percentage of the maximum number of competitions in which 72 elite fencers participated during the season from 2004 to 2016

The second group of fencers used tactics of gradual increase of FIE Ranking position. In 2004-2008 these types of tactics were used by 4 athletes, in 2008-2012 – 8, and in 2012-2016 – 5. Unlike the first group, their results improved subsequently during the whole Olympic cycle (Table 2). The range between minimum and maximum results was wider than in the first group. For example, the positions of some athletes in FIE Ranking List in the 1<sup>st</sup> and 2<sup>nd</sup> seasons were 130 and 317 respectively. Indicator of medal achievements was lower than in the first group – from 5.48 to 25.02 %. Most fencers of the second group could not become medalists in any event during 1<sup>st</sup>-3<sup>rd</sup> seasons. However, most of their indicators increased in the 4<sup>th</sup> season.

In comparison, tactics in the third group of athletes were partially similar to the first and second groups. In 2004-2008 it was used by 6 athletes, in 2008-2012 – 4, and in 2012-2016 – 10. During 1<sup>st</sup> and 2<sup>nd</sup> season of each Olympic cycle fencers improved their results and FIE Ranking positions – average positions were 33.00 and 32.55 respectively. The same situation concerned indicators of medal achievements and results at World Championships (Table 3).

However, in the 3<sup>rd</sup> and 4<sup>th</sup> seasons, most athletes increased their results and became leaders in FIE Ranking List (top-8). Average indicators of medal achievements were higher than in the second group but lower than in the first. Some of them finished the 1<sup>st</sup> and 2<sup>nd</sup> sea-



**Table 1.** The dynamics of competition practice and results of elite fencers who used tactics of leadership holding in 2004–2016 Olympic cycles (n=26)

Indicators	Seasons (years of each Olympic cycle)				ANOVA p-value	KW p-value
	1	2	3	4		
<b>The number of events</b>	X ± SD	8.16 ± 2.19	9.23 ± 1.31	9.96 ± 1.08	10.15 ± 1.26	
	Min – Max	1 – 10	6 – 11	8 – 12	7 – 13	
	W	<0.001	0.026	0.012	0.002	0.0002*
<b>Indicator of medal achievements</b>	X ± SD	50.93 ± 24.51	51.50 ± 22.51	49.15 ± 17.25	46.90 ± 19.39	
	Min – Max	0,00 – 100	18,18 – 100	10,00 – 88,89	10,00 – 80,00	0.906
	W	0,964	0,165	0,724	0,449	
<b>The highest result</b>	X ± SD	1.40 ± 0.91	1.23 ± 0.82	1.12 ± 0.33	1.38 ± 0.70	
	Min – Max	1 – 5	1 – 5	1 – 2	1 – 3	0.309
	W	<0.001	<0.001	<0.001	<0.001	0.437
<b>The lowest result</b>	X ± SD	19.84 ± 13.03	19.35 ± 10.52	20.00 ± 9.19	22.65 ± 9.68	
	Min – Max	1 – 59	3 – 35	5 – 35	5 – 36	0.656
	W	0.019	0.002	0.002	0.002	
<b>Position in FIE ranking</b>	X ± SD	4.72 ± 5.28	3.50 ± 2.32	3.23 ± 2.07	3.27 ± 1.97	
	Min – Max	1 – 20	1 – 8	1 – 8	1 – 8	0.995
	W	<0.001	0.002	0.003	0.017	0.293
<b>Results at the main competitions</b>	X ± SD	4.48 ± 3.89	5.38 ± 5.50	6.69 ± 7.27	2.46 ± 1.14	
	Min – Max	1 – 17	1 – 17	1 – 33	1 – 4	0.072
	W	<0.001	<0.001	<0.001	0.002	0.024*

Legend. X – arithmetic mean; SD – standard deviation; Max – the maximum in the season; Min – the minimum in the season; indicator of medal achievements – the ratio of events in which athletes won medals to the total number of tournaments held by them during the season (%); the highest/ the lowest results – the highest/ the lowest places which athletes achieved during the season; results at the main competitions – the places taken by athletes at the World Championships in 1<sup>st</sup>–3<sup>rd</sup> seasons of each Olympic cycle, and the Games of XXIX, XXX, XXXI Olympiads in 2008, 2012, 2016 respectively; W – Shapiro-Wilk p-value; \* – significantly different indicators (p ≤ 0.05).

Table 2. The dynamics of competition practice and results of elite fencers who used tactics of gradual increase of FIE Ranking position in 2004-2016 Olympic cycles (n=17)

Indicators	Seasons (years of each Olympic cycle)				ANOVA p-value	KW p-value
	1	2	3	4		
The number of events	X ± SD	5.63 ± 2.94	7.31 ± 2.77	9.53 ± 1.77	9.53 ± 1.18	
	Min – Max	1 – 10	2 – 10	7 – 14	8 – 12	<0.001*
	W	0.121	0.019	0.147	0.104	
Indicator of medal achievements	X ± SD	7.47 ± 15.20	5.48 ± 9.07	12.02 ± 7.96	25.02 ± 15.92	
	Min – Max	0.00 – 50.00	5.48 – 33.33	0.00 – 30.00	0.00 – 60.00	<0.001*
	W	<0.001	<0.001	0.092	0.101	
The highest result	X ± SD	9.56 ± 7.38	11.56 ± 15.38	5.47 ± 6.92	1.65 ± 0.86	
	Min – Max	1 – 29	2 – 60	1 – 23	1 – 4	0.02*
	W	0.054	<0.001	<0.001	<0.001	
The lowest result	X ± SD	60.44 ± 33.03	64.31 ± 30.20	69.59 ± 35.03	55.24 ± 37.91	
	Min – Max	12 – 140	16 – 135	29 – 133	17 – 167	0.861
	W	0.142	0.503	0.061	0.001	
Position in FIE ranking	X ± SD	58.31 ± 32.97	60.88 ± 78.29	22.53 ± 19.38	6.29 ± 3.22	
	Min – Max	17 – 130	12 – 317	1 – 72	1 – 14	0.001*
	W	0.230	<0.001	<0.001	0.538	
Results at the main competitions	X ± SD	37.58 ± 27.17	36.14 ± 22.80	18.25 ± 12.82	2.88 ± 0.99	
	Min – Max	6 – 94	3 – 75	2 – 55	1 – 4	<0.001*
	W	0.096	0.539	0.029	0.015	

Legend. X – arithmetic mean; SD – standard deviation; Max – the maximum in the season; Min – the minimum in the season; indicator of medal achievements – the ratio of events in which athletes won medals to the total number of tournaments held by them during the season (%); the highest/ the lowest results – the highest/ the lowest places which athletes achieved during the season; results at the main competitions – the places taken by athletes at the World Championships in 1<sup>st</sup>-3<sup>rd</sup> seasons of each Olympic cycle, and the Games of XXIX, XXX, XXXI Olympiads in 2008, 2012, 2016 respectively;

W – Shapiro-Wilk p-value; \* – significantly different indicators ( $p \leq 0.05$ ).

**Table 3.** The dynamics of competition practice and results of elite fencers who used combined tactics (gradual improvement of FIE Ranking position and leadership holding) in 2004–2016 Olympic cycles (n=20)

Indicators	Seasons (years of each Olympic cycle)				ANOVA p-value	KW p-value
	1	2	3	4		
The number of events	X ± SD	6.63 ± 2.19	7.85 ± 2.56	10.35 ± 1.31	10.00 ± 1.41	
	Min – Max	3 – 10	1 – 11	9 – 14	8 – 14	<0.001*
	W	0.263	0.023	0.002	0.008	<0.001*
Indicator of medal achievements	X ± SD	12.74 ± 11.79	19.75 ± 17.67	35.55 ± 19.75	31.41 ± 16.20	
	Min – Max	0.00 – 40.00	0.00 – 62.50	10.00 – 100	10.00 – 66.67	<0.001*
	W	0.033	0.052	0.005	0.074	<0.001*
The highest result	X ± SD	5.95 ± 7.61	7.30 ± 16.81	1.40 ± 0.50	1.35 ± 0.59	
	Min – Max	1 – 33	1 – 76	1 – 2	1 – 3	0.046*
	W	<0.001	<0.001	<0.001	<0.001	<0.001*
The lowest result	X ± SD	36.42 ± 14.33	49.45 ± 26.12	39.65 ± 23.31	32.20 ± 7.88	
	Min – Max	18 – 68	17 – 112	3 – 103	5 – 45	0.02*
	W	0.015	0.072	0.002	<0.001	0.12
Position in FIE ranking	X ± SD	33.00 ± 28.73	32.55 ± 62.36	4.75 ± 2.53	3.45 ± 2.46	
	Min – Max	8 – 112	1 – 266	1 – 8	1 – 8	0.002*
	W	0.001	<0.001	0.059	0.006	<0.001*
Results at the main competitions	X ± SD	21.93 ± 13.93	11.94 ± 8.84	7.70 ± 7.79	2.15 ± 1.09	
	Min – Max	6 – 55	3 – 33	1 – 33	1 – 4	<0.001*
	W	0.067	0.031	<0.001	0.005	<0.001*

Legend. X – arithmetic mean; SD – standard deviation; Max – the maximum in the season; Min – the minimum in the season; indicator of medal achievements – the ratio of events in which athletes won medals to the total number of tournaments held by them during the season (%); the highest/ the lowest results – the highest/ the lowest places which athletes achieved during the season; results at the main competitions – the places taken by athletes at the World Championships in 1<sup>st</sup>-3<sup>rd</sup> seasons of each Olympic cycle, and the Games of XXIX, XXX, XXXI Olympiads in 2008, 2012, 2016 respectively; W – Shapiro-Wilk p-value; \* – significantly different indicators (p ≤ 0.05).

sons at 112 and 266 positions in FIE Ranking List, but in the next seasons they also increased their results and became leaders.

The fourth group included 5 athletes who used tactics of holding FIE Ranking position. In 2004-2008 it was used by 2 fencers, in 2008-2012 – 1, in 2012-2016 – 2. Specifics of their tactics provided holding FIE Ranking position from 10 to 21 places in each season. Average indicators of medal achievements varied from 17.11 % in the 1<sup>st</sup> season to 17.39 % in the 4<sup>th</sup>. The average volume of competition practice ranged from 9.40 events in the 1<sup>st</sup> season to 8.60 – in the 4<sup>th</sup>. None of the athletes succeeded in winning medals at the World Championships in the 1<sup>st</sup>-3<sup>rd</sup> seasons of each Olympic cycle.

The fifth group of athletes (n=4) used leadership coming back tactics. Their FIE Ranking positions were high in most seasons (top-3). However, in the 2<sup>nd</sup> of 3 seasons, each of them failed at the World Championships and other events. Instead, in the next season they became leaders of FIE Ranking List and achieved high results almost in all events. Average indicators of medal achievements varied from 8.13 to 66.67 % in each season (the highest values were in the 1<sup>st</sup> and 4<sup>th</sup> seasons). The volumes of competition practice were 6-10 tournaments per season. For example, at the World Championship-2011 B. H. (Federal Republic of Germany) failed to overcome the preliminary qualifying round and finished at 126<sup>th</sup> place. It influenced on her FIE Ranking position at the end of the season (24<sup>th</sup> place). The same situation was typical for S. L. (People's Republic of China). In the 2010-2011 seasons he finished most of the tournaments (40.00%), including the World Championship, at the stage of the 1/8. Instead, in the 4<sup>th</sup> season (2011-2012) both fencers became medalists at the Games of XXX Olympiad 2012 in London (silver and gold medals respectively).

## Discussion

In most scientific papers on tactics and tactical training in fencing, the main subjects of the research are the indicators of athletes' performance and their changes after the Competition Rules modifications [Tarrago *et al.* 2016; Baidachenko, Gamaliy, Shevchuk 2018]. The current trends illustrate that the implementation of different punishments influence technical and tactical actions. For example, yellow and red cards for a passive bout in fencing (the absence of active actions at the beginning or in the middle of the bout) urge the athletes to use different actions using their blades or footwork [Allerdissen *et al.* 2017; Bober *et al.* 2017; Chen *et al.* 2017]. Some authors mention that such changes in Competition Rules have led to an impoverishment of technical and diversification of tactical actions [Harmenberg 2007; Barth, Barth 2007; Baidachenko, Gamaliy, Shevchuk 2018]. At the same time, the speed and intensity of bouts significantly

increased. That is why decision-making is an essential part of athletes' skills, especially in fencing. This issue is widely discussed in the scientific literature [Kogler 2004; Kriventsova *et al.* 2017; Szajna, Bak, Kulasa 2019].

The most fundamental research devoted to tactical skills in fencing during the last 10 years was made by Ryzhkova [2014]. The author also used an expert assessment to determine the most essential components of tactical preparedness and developed several technologies to improve athletes' tactical skills [Ryzhkova 2014]. Their effectiveness was revealed in pedagogical experiments. In our opinion, this research is very useful for fencers, but it does not take into account the part of decision-making which concerns participation tactics in the tournament or the whole season.

At the same time, a great amount of issues of tactical training remain undiscovered. In our previous papers, we discussed the algorithm of tactical training for elite fencers and the role models of athletes which should be used in tactical training during the season [Briskin *et al.* 2018; Zadorozhna *et al.* 2020; Zadorozhna *et al.* 2021]. It was established that even elite fencers do not usually succeed both in individual and team events. This fact should be taken into account in the formation of team tactics during the season, especially during the Olympic qualification period.

In this paper, our attention is paid to the participation tactics of elite fencers during four seasons in the whole Olympic cycle from 2004 to 2016. Unfortunately, because of worldwide pandemic Covid-19 the main part of 2019-2020 and 2020-2021 seasons was cancelled (as well as the last Olympic qualification tournaments). That is why it is impossible to make correct conclusions on participation tactics in the current Olympic cycle 2016-2020. Nonetheless, the trends discovered in previous Olympic cycles are almost similar, because the competition system and Olympic qualification criteria are the same in comparison with the previous period.

In our opinion, the differences between competition practice in the three Olympic cycles could be connected with some reasons. First of all, it concerns the official FIE competitions calendars, which were unstable in 2004-2010. The number of tournaments for epee, sabre and foil fencers changed every year (the maximum number of events was 14-17). For example, Zonal Championships (European, Asian, African, Pan-American) were included in the FIE calendar as official events in 2005. Before that time their status was unofficial so the athletes could not get any ranking points. This allowed the athletes to increase or decrease competition practice according to the specifics of their training in a particular season.

We should mention that from the perspective of increasing the FIE Ranking position, wide competition practice is not always essential. A Ranking List is formed by adding points seven best results of the season. Therefore, fencers who performed well during a particular



season could miss some tournaments if these events did not influence their Ranking positions. Instead, athletes whose results were less successful at the beginning and in the middle of the season could increase their competition practice to improve their Ranking positions. According to changes in the official FIE competition calendars in 2011, the maximum number of events in all weapons was reduced to ten per year (excluding Satellite events). If in previous seasons fencers could choose from more tournaments, since 2011 this choice has become limited. This, in turn, affected their participation tactics in the competition system. It was confirmed by the changes in the volume of competition practice from 2004 to 2016 in percentage (% of the maximum possible number of competitions during each season, Figures 1, 2).

In addition, it was found that elite athletes used three main types of participation tactics – leadership holding, gradual increase of FIE Ranking position, combined tactics (in the 1<sup>st</sup> and 2<sup>nd</sup> seasons – gradual improvement of FIE Ranking position and leadership holding – in the 3<sup>rd</sup> and 4<sup>th</sup> seasons). Additional types included holding FIE Ranking position and leadership coming back tactics. It was established that in 2004-2008 and 2008-2012 the most popular was the tactics of leadership holding (top-8 of FIE Ranking List), which was used by 45.83 and 37.50% of athletes respectively, in 2012-2016 – combined tactics (41.67%).

It is interesting that in 2004-2008 and 2008-2012, among the athletes who used leadership tactics, there were only sabre and foil fencers, and the number of women outnumbered the men. In 2012-2016, instead of foil fencers, they were joined by women epee fencers. However, during 2004-2016, tactics of leadership holding were not typical for any men's epee fencer. In our opinion, this is due to the fact that the rivalry in epee fencing is the greatest. For example, the participants of men's epee events are more than 250 athletes (in foil and sabre – 100-150 athletes). At the present stage, about 30 epee fencers may apply for medals at various competitions. That is why, holding the leadership during the season or the whole Olympic cycle becomes more and more difficult. Therefore, for epee fencers the most relevant in 2004-2016 were tactics of gradual increase of the FIE Ranking position and combined tactics.

The increase of rivalry not only in the international arena but also at the level of national teams is evidenced by the decrease in 2012-2016 in the number of athletes who completely missed certain seasons. Among 72 athletes whose profiles were analyzed in our research, the first season of the 2004-2008 Olympic cycle was missed by G. T. (Italian Republic), and the second by I. M.-N. (Hungary). In the 2008-2009 season, representatives of the Republic of Korea Ji. K. and W. Ch. did not take part in any official international event. In 2012-2013, only S. P. from the Republic of Korea completely missed the season. It should be noted that during 2004-2016 no athlete

missed the 3<sup>rd</sup> season. On the contrary, all the world's leading fencers have increased their competitive practice.

In 2012-2016, the number of athletes who did not take part in the World Championships because of unknown reasons increased. In 2004-2008 there were six of them. In the 2004-2005 season, three athletes did not take part in the main competitions, in 2005-2006 – two, in 2006-2007 – one. In the 2008-2012 Olympic cycle, the total number of these athletes was less than in 2004-2008. In 2012-2016, the total number of fencers who missed the World Championship in different seasons was eleven. In the 2012-2013 season, there were five of them. In 2013-2014 and 2014-2015 – three. One explanation may be the high rivalry at the level of national teams, which enabled some athletes to join the national teams at the main events of the season.

The participation tactics of nine athletes in 2004-2016 provided for a combination of performances in several age categories. In 2004-2008, there were four of them. Athletes used three types of tactics. The first one was a combination of performances in the age categories “Juniors” and “Seniors” with a preference for the second. These tactics were used by S. V. (Russian Federation) in the 2004-2005 season, O. Kh. (Ukraine) – in 2008-2009, Yu. S. (People's Republic of China) – in 2008-2011, A. M. (USA) – in 2012-2014. Competition practice among “Juniors” included only World Championship, where all fencers won medals. Interestingly, all athletes in the 3<sup>rd</sup> and 4<sup>th</sup> seasons entered the top-6 of the FIE Rankings, and Yu. S. headed it.

The second type of tactic was combining performances in “Juniors” and “Seniors” with equal attitude to both of them. It was used by M. Z. (USA) and B. K. (Federal Republic of Germany) in the 2004-2005 season, and by A. A. (Arab Republic of Egypt) in 2008-2010. The difference between that type of tactic and the previous one was that the athletes attended approximately the same number of events in both age categories. The results were high in both of them.

The third type of tactic provided the change of the priority given to “Cadets”, “Juniors” and “Seniors” within the Olympic cycle. It was typical for R. W. (USA) and M. B. (French Republic). In the 2004-2005 and 2005-2006 seasons, R. W. participated in approximately the same number of events in all age categories, showing stable and high results. Interestingly, in the 2005-2006 season, R. W. won the World Championships in all age categories. However, in 2006-2007 and 2007-2008, she preferred performances among “Seniors” (participation in “Juniors” was episodic). In 2012-2013, M. B. preferred to perform in “Juniors”. Competition practice in “Juniors” was six events, in “Seniors” – three events. In the 2013-2014 season, the number of competitions “Juniors” was, in “Seniors” – seven. In the 2014-2015 season, M. B. reduced performances in “Juniors” to three per year and increased it in “Seniors” to ten events. The same thing was typical for the 2015-2016 season.

The obtained results allowed us to conclude the following. The structure of competition systems during this period was stable. It provided the possibility to combine participation in different age categories and advantages for the leaders of the FIE Ranking List when participating in international official tournaments (skipping the pre-qualification round for the top 16 athletes). The participation tactics of elite fencers aimed to demonstrate results, which allowed them to maintain FIE Ranking positions (in the top-8, or from 10 to 21 places). The other option was to improve FIE Ranking positions in each season. In case of a decrease in results and FIE Ranking position athletes used tactics of leadership coming back. Holding or improving the FIE Ranking position was possible through the increase of competition practice, stable and high results almost in all contests.

## Conclusions

1. Tactic is one of the basic terms in fencing. It is used in combination with a term strategy. Strategy is a general plan for the whole bout or its fragments, during the whole event (competition), within the season or the Olympic cycle. Tactics are the range of special actions used for the achievement of a particular aim according to strategy. In the scientific literature, the main attention is paid to tactics of bouts and their fragments, while tactics of the whole event and season are discovered fragmentally.

2. The participation tactics in the fencing competition system aimed at demonstrating high and stable results during the season. This enables athletes to hold or improve their FIE Ranking position. Most of the elite fencers prefer to take part in events with more Ranking points (World Championships, World Cups and Grand Prix). The volume of competition practice may differ depending on the season. In the 2004-2008 and 2008-2012 Olympic cycles most athletes increased their performances during the 1<sup>st</sup>-3<sup>rd</sup> seasons from 6.96 to 11.08 events (average mean). In the 4<sup>th</sup> season those indicators decreased to 9.00 events. However, in 2012-2016 Olympic cycle competition practice of most athletes subsequently grew from 7.30 events (average mean) in the 1<sup>st</sup> season to 9.63 in the 4<sup>th</sup>.

3. There are five types of participation tactics of elite athletes in the competition system: leadership holding, gradual increase of the FIE Ranking position, combined tactics (in the 1<sup>st</sup> and 2<sup>nd</sup> seasons – gradual improvement of the FIE Ranking position and leadership holding – in the 3<sup>rd</sup> and 4<sup>th</sup> seasons), holding the FIE Ranking position and leadership coming back. The most actual in 2004-2008 and 2008-2012 was tactics of leadership holding. It was used by 45.83 and 37.50% of athletes respectively. In 2012-2016 the most popular was combined tactics (41.67% of fencers used it). The additional types of tactics include three types: 1 – participation in "Seniors" and

"Juniors" with preference given to "Seniors"; 2 – performances in "Seniors" and "Juniors" with equal attitude; 3 – participation in "Seniors", "Juniors" and "Cadets" with the change of preference during the Olympic cycle.

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## Taktyka uczestnictwa elitarnych szermierzy w systemie rywalizacji w cyklach olimpijskich 2004-2016

**Słowa kluczowe:** trening taktyczny, zawody, sportowiec, ranking, Igrzyska Olimpijskie

### Streszczenie

Tło. Taktyka jest jednym z podstawowych pojęć w szermierce. Większość autorów rozważa ją tylko podczas walki.

Problem i cel. Taktyka uczestnictwa w poszczególnych zawodach lub w trakcie sezonu jest ujęta fragmentarycznie i wymaga odpowiedniego uzasadnienia. Badanie miało na celu analizę specyfiki taktyki uczestnictwa elitarnych szermierzy w systemie rywalizacji podczas trzech cykli olimpijskich od 2004 do 2016 roku.

Metody. Analiza teoretyczna, metoda dokumentacyjna, uogólnienie danych literaturowych i internetowych pozwoliły na zidentyfikowanie problematycznego obszaru taktyki w szermierce. Następnie przeanalizowano indywidualne profile 72 elitarnych szermierzy na stronie internetowej FIE podczas trzech cykli olimpijskich w latach 2004-2016 (łącznie liczba zawodów, wyniki w Pucharach Świata, Grand Prix, Mistrzostwach Świata, pozycje na liście rankingowej FIE, osiągnięcia medalowe). Wyniki zostały przetworzone przy użyciu oprogramowania STATISTIKA 10.0 i Microsoft Excel.

Wyniki. Praktyka zawodnicza szermierzy elity różni się w zależności od sezonu. W latach 2004-2008 i 2008-2012 większość z nich zwiększyła swój udział w 1-3 sezonach z 6,96 do 11,08 zawodów (średnia średnia). W czwartym sezonie praktyka zawodnicza obejmowała 9,00 turniejów. W latach 2012-2016 praktyka zawodnicza większości szermierzy wzrosła z 7,30 zawodów w 1. sezonie do 9,63 w 4. sezonie. Dynamika wyników szermierzy różniła się w zależności od sezonu.

Wnioski. Zgodnie z dynamiką wyników szermierzy zidentyfikowano pięć rodzajów taktyk uczestnictwa: utrzymywanie pozycji lidera, stopniowy wzrost pozycji w rankingu FIE, taktyki łączone, utrzymywanie pozycji w rankingu FIE i powrót lidera. Grupa zawodników łączyła występy w kilku kategoriach wiekowych: Kadeci, Juniorzy i Seniorzy.